



# Lobed Mixer Design for Noise Suppression

## Plume, Aerodynamic and Acoustic Data

Vinod G. Mingle, V. David Baker, and William N. Dalton  
Rolls Royce Allison, Indianapolis, Indiana



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Note that at the time of research, the NASA Lewis Research Center was undergoing a name change to the NASA John H. Glenn Research Center at Lewis Field. Both names may appear in this report.

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## **Preface**

The final report is written in two volumes. In the first volume we present the design philosophy of the new lobe mixers tested, and then analyze the results of various acoustic and aerodynamic tests done at NASA Lewis Research Center, Cleveland,

Ohio and Aero Systems Engineering FluidDyne Laboratories, St. Paul, Minnesota over a period of three years (1995-1997). The second volume is a compilation of data from the plume survey and the aerodynamic data for the acoustic tests.







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Guide to Plume Survey Data as plotted in Vol. 2 (parts 1, 2) and FluidDyne Tests\*

MIXER	T.O. # 1										T.O. # 2									
	Velocity		Total Temperature		0.1		0.2		0.5		1		C.L.**		Velocity		Total Temperature			
	x/D=0.2	1	>1.0	C.L.**	0.1	0.2	0.5	1	>1.0	C.L.**	0.2	0.5	1	>1.0	C.L.**	0.2	0.5	1	>1.0	C.L.**
CONF					FD(M=0)* 8 (M=0.1) 27(M=0.1) 29(M=0.1)		28(M=0.1)		30(M=0.1) 31(M=0.1)	45(M=0.1)										
12CL 100%L	12 13	20	1		FD(M=0)* 9(M=0.1) 32(M=0.1)		33(M=0.1) 36		34(M=0.1) 35(M=0.1)	61 12* 45(M=0.1)	15 33	24 34 35	2.5 17*							
12CL 50%L			1							61 12*	14									
12UH					FD(M=0)* 10(M=0.1) 37(M=0.1)				38(M=0.1) 40(M=0.1)	45(M=0.1)										
12TH	18		1 3 (M=0)							61 12*						65 14*, 23*				
16UH					FD(M=0)* 41(M=0.1) 11(M=0.1)		42(M=0.1)		43(M=0.1) 44(M=0.1)	45(M=0.1)										
20UH			1			25*				61 12*										
20DH	9 10	19 60 (Jet Wake)	1		63 24*					61 12*	11 26	27 28	2.4 17*	29 30	64, 66 70	67 71	68 72	69 71	70 72	13*

Notes: \* Plume survey figure numbers are for free-jet Mach no. (M) of 0.2 unless mentioned; Light References = Figure nos. in Part 1, Vol. 2;  
 Bold references = Figure nos. in Part 2, Vol. 2 FD = 1995 FluidDyne surveys: All Temperature surveys are at nozzle-exit plane;  
 FluidDyne tests also have total pressure survey plots at the mixer exit plane for the same conditions as the corresponding total temperature surveys  
 \*\* C.L. = Center-Line Traverse  
 \* = Non-dimensional



Guide to Plume Survey Data as plotted in Vol. 2 (parts 1, 2) and FluidDyne Tests

MIXER	T.O. # 3				Cruise	
	Velocity 0.2 0.5	1	>1.0 C.L.**	Total Temperature 0.2 0.5 C.L.**	Total Temperature Nozzle-Exit FD(M=0)*	
CONF					FD(M=0)*	
12CL 100%L	17 16 40	23 22 42	2,8 18* 43 44 45 46	1 5 15* 19*	FD(M=0)*	
12CL 50%L	47 48	49 50 51 52 53	2,7	2 6 18* 20*	FD(M=0)*	
12UH					FD(M=0)*	
12TH				3 4 15* 21*	FD(M=0)*	
16UH					FD(M=0)*	
20UH						
20DH	54 21 55	56 57 58 59	2,6 18*	7 15* 22*		







**Part 1**  
**Plume Survey Data**

**Von D. Baker**







## **SUMMARY**

During December 1996 and 1997, exhaust plume survey measurements were taken on several scale models of Rolls-Royce Allison exhaust acoustic mixer designs with the objective of reducing the take-off and approach noise signature of advanced civil turbofan engines. The plume data was plotted and analyzed for Rolls-Royce Allison by Allison Advanced Development Company (AADC) from the NASA data files transmitted to Rolls-Royce Allison.

These tests were conducted at the NASA-LeRC as part of the AST program under contract NAS3 27394, Task Order 6. The purpose of this report is to present the plume data analysis of immediate interest to Rolls-Royce Allison Acoustic Design Group. Additional plume data analysis is also provided in Part 2. Data plots and pertinent comments are presented in the following order:

1. Plume Velocity Data Plots
  - 1.1 Maximum "centerline" velocity decay
  - 1.2 Selected velocity profiles at  $x/D=0.2$
  - 1.3 Selected velocity profiles at  $x/D=1.0$
  - 1.4 Selected velocity profiles at all  $x/D$  values from 0.2 to 10.0
  - 1.5 Typical "Jet Wake Diagram"
2. Plume Total Temperature Data Plots
  - 2.1 Maximum "centerline" Tt decay
  - 2.2 Selected Tt profiles at  $x/D=0.2$
  - 2.3 Selected Tt profiles at all  $x/D$  values from 0.2 to 10.0
3. Conclusions

### **1.0 Plume Velocity Data Plots**

Selected plume velocity data plots are presented as shown in Figures 1 to 59. The plume velocity was calculated by NASA from the measured total pressure (Pt), static pressure (Ps) and total temperature (Tt) values at each measurement step taken in the plume. From isentropic flow equations, the sonic velocity and local Mach number at each step was calculated and then converted to the local plume axial velocity in ft/sec.

A simplified sketch of the NASA traversing rake assembly and measurement axis definition is shown in Figure A. The rectangular array traversing rake assembly consisted of one vertically aligned set of Pt rakes, one vertically aligned set of Tt rakes, and two vertically aligned sets of Ps taps, all aligned in the "Z" direction. In operation, the array was positioned at different axial distances from the nozzle exit plane, or  $x/D$  values, and then traversed across the plume using a motorized drive. The "x" value is the axial distance in inches and "D" is the nozzle exit diameter of 7.250 inches nominally.

The  $x/D$  values varied from a minimum of 0.2 to a maximum of 10.0. A full survey consisted of  $x/D$  values of 0.2, 0.5, 1.0, 3.0, 5.0, 7.5, & 10.0. At each  $x/D$  location either a "full" traverse or partial traverse of the "center" region (or lateral sweep) by the rectangular array across the plume was made in 1/4" steps in the "Y" direction. The data was acquired in an over-lapping manner such that a corresponding measured Pt, Tt, and Ps value was obtained for each data point location in the Y-Z measurement plane.

A "full" survey typically swept from left to right a "Y" distance of -4.75 inches to +4.75 inches from the center of the array. In order



to conserve testing time, a "center" traverse was also used for several  $x/D$  values that would typically vary from -0.75 inches to +0.75 inches. The vertical or "Z" sweep was constant at -5.00 inches to +5.00 inches, with 1/4 inch spacing between adjacent probes, in all cases being defined by the spacing built into the array.

The respective fan and core nozzle pressure ratios (NPR) and total temperature ratios tested were selected to simulate different take-off thrust settings of an advanced turbofan engine for two typical aircraft installation cycles, referred to as the "F" and "G" cycles, and a growth engine cycle, referred to as the "H" cycle. The test conditions are summarized in Table I. To simplify the discussion, the test conditions are hereafter referred to by the core NPR value.

A free stream take-off Mach number of 0.2 was simulated by placing the test mixers inside a large circular pipe which discharged ambient air over the mixers to simulate forward flight effects.

The 1996-97 NASA plume tests included the five mixers listed in Table II. Due to testing problems, it was not possible to test all mixers over the same range of test conditions. Also, all mixers were tested with a common baseline exhaust nozzle with a reference or "100%" mixing length. The 12 lobe baseline mixer (12CL) was also tested with a shortened "50%" length nozzle of reduced mixing length.

### 1.1 Maximum "centerline" velocity decay

Figures 1 through 8 were plotted from the data files for selected mixer configurations. These plots show the decay of the maximum profile velocity at each  $x/D$  value tested, normally from  $x/D$  of 0.2 to 10.

The maximum velocity was obtained by visually scanning the velocity data file for each  $x/D$  value data set. In most cases, as expected, the maximum velocity was found to be at the center of the array which was intended to coincide with the nozzle centerline location. In some cases, the maximum velocity was found to be located at a slightly off-center location in the array. This off-setting of the profile may be due to a shift in the alignment of the instrumentation array relative to the nozzle centerline, when the nozzle is flowing.

Figure 1 compares the maximum velocity decay for each mixer at the 1.39 core NPR condition. In general, all of the mixers exhibit a constant maximum velocity core length of about 1 diameter, except the 12 lobe baseline mixer (12CL) with 50% nozzle length. Beyond this length the core begins to decay at a somewhat linear rate when plotted on the logarithmic abscissa scale. The 20 lobe deep mixer (20DH) exhibits lower velocities than the other mixers; however, surprisingly, the 20 lobe unscalloped mixer (20UH) which was only tested up to  $x/D$  of 1.0 shows the lowest velocities.

Figure 2 shows the effect of the 1.54 and 1.74 core NPR schedule for the 12 lobe baseline mixer (12CL) and 20 lobe deep scalloped mixer (20DH). Trends similar to the data in Fig. 1 are noted; however, the velocity levels are increased which reflect the higher NPR schedules. Again, the 20 lobe deep scalloped mixer (20DH) exhibits the lowest velocities. Note that in both Figures 1 and 2, the plume velocity tends to converge to the same value for all mixers, at a given NPR schedule, at  $x/D$  of about 10. This suggests that the benefit of the mixer geometry in affecting the velocity decay diminishes beyond  $x/D$  of 10 and is



primarily controlled by approaching the ideal mixed velocity (conservation of mass, energy, and momentum) which is a function of the bypass ratio (BPR) and total temperature ratio of the fan and core stream.

Figures 3 through 8 show additional maximum "centerline" velocity plots at other selected conditions with trends similar to those noted above.

## 1.2 Selected velocity profiles at $x/D=0.2$

Figures 9 through 18 show typical velocity traverses at  $x/D=0.2$  which was the nearest measurement  $x$  value to the nozzle exit plane. The vertical height,  $Z$ , plotted on the abscissa scale represents the probe locations, typically in 1/4 inch spacings, above and below the nozzle centerline. Thus, the true orientation of the velocity profile can be obtained by turning the plot 90 degrees such that the velocity scale is along the horizontal (centerline) direction.

Note that the nozzle exit diameter is 7.250 inches for all plots. Thus the location of the nozzle exit relative to the "Z" scale can be noted at a value of + and - 3.625 inches (the nozzle radius). Velocities outside the nozzle radius are thus indicative of the free stream flow conditions and boundary layer on the external diameter of the nozzle.

The plotted "Y" values represent the traverse location, in inches, of the rakes. Figure 9 shows a typical "center" survey with Y values from -0.75 inches to +0.75 inches on either side of the center meridian plane. Thus a Y value of 0.0 represents the plane containing the nozzle centerline. Figure 10 is the same condition as Figure 9 but shows a typical "full" survey in the Y direction with Y values from -4.75 to +4.75; however, for clarity some of the in between Y values were deleted. Figure 11

shows a "full" survey with the maximum number of Y values that can be plotted by Excel, in this case, from Y = -4.75 to Y = 3.75 (values from 3.75 to 4.75 were deleted due to plotting restrictions).

One way to understand the velocity profiles is to visualize a knife making parallel slices through a round cake. Thus near the edge of the cake (i.e.,  $Y = \pm 3.5$  inches) the "slices" are more narrow, parabolic shaped whereas a slice at the center diameter of the cake ( $Y=0$ ) defines the maximum width of the cake. i.e., the plume.

It should be noted that since the data were taken in a rectangular array, as selected by NASA, a rectangular array or "slices" was therefore the most cost-effective way to plot the plume data. Some surface plots are also included.

The Y traverses at  $x/D$  of 0.2 show a relatively complex but basically symmetrical velocity profile about the nozzle centerline. Some general observations can be made by comparing the profiles in the following figures as shown in Table III

Referring to Figure 10, a relatively "flat" velocity profile is noted for the 20 lobe deep mixer (20DH) at around 800 ft/s, with a maximum velocity "peak" to just under 1000 ft/s occurring at the centerline. A more complex velocity profile is observed for the 12 lobe baseline mixer (12CL) in Figure 12, with a center "peak" and two basically symmetrical outer "peaks" with velocities from about 950 ft/s, dropping to a "trough" of around 750 ft/s and then increasing to the maximum centerline velocity of just over 1000 ft/s. A similar trend is noted in Figure 13 for the baseline mixer with 50% length nozzle except the corresponding peaks are about 50 ft/s higher suggesting less mixing with the shorter length nozzle. The tongue



mixer, Figure 18, exhibits a velocity profile characteristic between the 20 lobe deep mixer (20DH) and the 12 lobe mixer with less peaking observed on the outer two peaks, but about the same centerline velocity of just over 1000 ft/s.

The other plots in this section are for different NPR operating conditions and, in general reflect the same trends as noted above with the velocity levels increasing with increasing NPR values and conversely.

### 1.3 Selected velocity profiles at $x/D=1.0$

Figures 19 through 25 show the changes in the velocity profile at  $x/D=1.0$ . The main change in the profile, for a given NPR schedule, appears to be more mixing at the outer edge reflected by the tapering inwards of the outer profile towards the center with some small reduction in peak velocities compared to the profile at  $x/D$  of 0.2. Figure 20 shows this tapering in of the outer profile for the 12 lobe mixer (12CL) at 1.39 NPR)core, with a corresponding peak centerline velocity of about 1050 ft/s. Increasing the NPR)core value to 1.74 (Figure 23) resulted in peak centerline velocities approaching 1400 ft/s for the 12 lobe baseline mixer (12CL), dropping to around 1250 ft/s maximum for 1.54 NPR)core (Figure 24).

### 1.4 Selected velocity profiles at all $x/D$ values from 0.2 to 10.0

Figures 26 through 59 show typical examples of the transformation of the velocity profile from  $x/D$  of 0.2 to  $x/D$  of 10.0 for several NPR operating conditions and mixers. In general, the profile decay is somewhat similar in each case in terms of profile shape transformation. The discreet effects of the mixer geometry on the plume velocity profiles can usually be discerned at

$x/D$  values from 0.2 up to around 3.0 to 5.0. Beyond this  $x/D$  distance, the profiles show more similarity with less individualized profiles due to the mixer geometry.

Figures 41 through 46 show the profiles for the 12 lobe baseline mixer (12CL) as an example which show the coalescence of the three distinct velocity peaks at  $x/D$  of 0.5 (Figure 41), to the leveling off of the outer peaks at  $x/D=3.0$  (Figure 43), to the "parabolizing" of the contour to one center peak at  $x/D=5.0$  (Figure 44), and a gradual decreasing of the parabolic-shaped profile to a lower velocity level (Figure 46) at  $x/D=10.0$ . This general trend in the plume profile transformation occurred for all mixers with velocity levels changing with NPR levels as noted previously.

The symmetry of the velocity measurements, from the upper half to the lower half of the profile, generally show good agreement; i.e., the profile is observed to be basically "mirrored" within measurement accuracy from top to bottom. There are some exceptions to this, as, for example, shown in Figures 43 and 44. These figures show some "blips" in the velocity profile at  $Z=3.0$  to 3.25 that is not the same "mirrored" shape as noted at  $Z=-3.0$  to -3.25. It is noted that these blips occur at all  $Y$  values, at the same  $Z$  values of approximately 3 to 3.5, and this pattern also repeats at other  $x/D$  values and mixer types.

### 1.5 Typical "Jet Wake Diagram"

It is possible to use the velocity contour plots at each  $x/D$  value to construct what is referred to as a "jet wake diagram" for each mixer. Jet wake (or plume) diagrams are commonly included in the Military Specifications requirements for turbojet and turbofan engine model specifications to depict the extent of the engine exhaust



velocity and temperature decay at SLS maximum thrust operation, or other specified conditions.

The jet wake diagram shows lines of constant velocity (or temperature) decay as a function of the non-dimensional horizontal distance  $x/D$ , and vertical distance  $z/D$  (the same as  $r/D$ ). Since the horizontal and vertical distance is non-dimensionalized to the same reference dimension, nozzle diameter, it is thus possible to "visualize" in proportion the plume velocity spreading rate and outer boundary when plotted in this manner.

Figure 60 shows a typical example of a velocity jet wake diagram for the 20 lobe deep mixer (20DH). This diagram was constructed using the velocity contour plots at each  $x/D$  value by determining the  $z$  values corresponding to the values of 200, 400, 600 ft/sec, etc. The  $z$  values were then non-dimensionalized to  $z/D$  for plotting vs.  $x/D$ . Curves drawn through each corresponding constant velocity point yields the final jet wake diagram. Similar diagrams could be constructed for other mixers or operating conditions if desired.

## 2.0 Plume Total Temperature Data Plots

The total temperature rake array, as shown in Figure A, was used to measure the  $T_t$  values in the exhaust plume, in degrees R, and was traversed across the plume as discussed previously in Section 1.0.

### 2.1 Maximum "Centerline" $T_t$ Decay

Examples of maximum "centerline" total temperature plots are shown in Figures 61 and 62. These plots were generated in the same manner as the maximum velocity plots discussed earlier except the total temperature data files were scanned for a

maximum value, which, again, occurs at or near the nozzle centerline.

Referring to Figure 61 for 1.39 NPR)core and 2.34  $T_t$ )core/ $T_t$ )fan, the maximum  $T_t$  plots tend to exhibit the same characteristics as the maximum velocity plots, namely: an approximately linear decay (on logarithmic scale) at  $x/D$  values beyond 1.0; a merging of the plots at  $x/D$  approaching 10.0, and approximately 150 deg lower  $T_t$ , or advantage, for the 20 lobe deep mixer (20DH) compared to the 12 lobe baseline mixer (12CL) at  $x/D$  of 1.0.

This lower temperature advantage significantly diminishes at  $x/D$  of 10.0 where the data for all mixers tend to merge to the same  $T_t$  value which again illustrates the global effect of the ideal mixed temperature being a function of BPR and  $T_t$ )core/ $T_t$ )fan (conservation of energy) rather than mixer type. As can be seen, however, the 20 lobe deep mixer (20DH) does enhance the mixing, by reducing maximum temperatures at a given  $x/D$ , in the very near field from the nozzle exit up to about  $x/D$  of 5.0 where the global effects begin to predominate and determine the "fully mixed" temperature decay.

Figure 62 shows the Maximum  $T_t$  decay for the 20 lobe deep mixer (20DH) at the higher 1.61 NPR condition. The trends, compared to the 20L data in Figure 61, are basically the same except the very near field  $T_t$  levels in Figure 62 are about 100 degrees R hotter reflecting the increased  $T_t$ ) core temperature and other flow condition differences.

### 2.2 Selected $T_t$ profiles at $x/D=0.2$

Figures 63 through 65 show typical total temperature "slices" through the plume at  $x/D=0.2$  for the 20 lobe deep mixer (20DH) and internal tongue mixer (12TH). Referring



to Figure 63 for the 20 lobe deep mixer (20DH) at the 1.39 NPR)core condition, the Tt plots are characterized by a fairly significant evidence of mixing for "Z" heights greater than 1.0 inches. For "Z" values less than 1.0 inch the profile begins to peak with a very rapid temperature spike developing at the centerline ( $Z=0$ ) indicating significantly reduced mixing within this zone.

Although the temperature spikes at the centerline are significant, the area within a 1 inch radius is less than 8 % of the nozzle exit geometric area, or conversely, 92% of the exit area has a significantly reduced, partially mixed, temperature.

Figure 64 shows a similar temperature profile for the 20 lobe deep mixer (20DH) at the 1.54 NPR)core condition. The centerline maximum Tt is approximately 150 R deg. hotter reflecting the increased thrust setting condition. Figure 65 shows the same condition for the internal tongue mixer (12TH). Note that the centerline maximum temperature is about 70 degrees hotter for the tongue mixer, and the outer temperature zone show two smaller temperature spikes at about 700 deg. R and a profile that is different than that shown for the 20 lobe deep mixer (20DH) in Figure 64.

### **2.3 Selected Tt Profiles at all x/D Values from 0.2 to 10.0**

Figures 65 to 72 characterize the Tt profile for the 20 lobe deep mixer (20DH) at the 1.54 NPR)core condition at x/D values from 0.2 to 10.0, which illustrate significant temperature contour transformation as the plume undergoes mixing.

At x/D of 0.2, nearest the nozzle exit, the characteristics described above are repeated in Figure 66. At x/D of 0.5, the profile has

not changed significantly, except the maximum "centerline" temperature is observed to have shifted slightly off-center to a "Z" value of 0.25 inches.

At x/D of 1.0, Figure 68, the maximum temperature level continues to drop at the centerline, with a less noticeable change in the outer zones. Moving to x/D of 3.0 the mixing process causes a more significant "smoothing" of the outer zone with a very symmetrical, "bell" shaped profile being produced.

Moving on to x/D values of 5.0, 7.5 and 10.0, shown in Figures 70, 71 and 72 respectively, the smooth "bell" shaped profile continues to reduce at the center zone and spread outwards. The contour is observed to be, within measurement accuracy, fairly symmetrical and does not exhibit any non-symmetrical "blips" as noted earlier in the velocity profiles. It is noted that while the temperature profiles appear to be very symmetrical, the center of the profile is shifted slightly in the positive "Z" direction away from the nozzle centerline at x/D values of 0.5, 7.5 and 10.0, i.e., as seen in Figure 72. The reason for this shift is not known, but may be related to the shift observed previously in the velocity profiles.

### **3.0 Conclusions**

1. The 1996-97 AST Mixer plume testing has generated a very significant data bank of plume measurements for several Rolls-Royce Allison acoustic mixers. A small portion of this data, showing representative trends, has been presented in this report, and other plots, of specific interest, can be generated as required in the future.

2. The plotted plume data show velocity and total temperatures that range from fairly



complex contours near the nozzle exit to more smoothly "parabolic" or "bell-shaped" contours at  $x/D$  values of 10.0 as the mixing process approaches a more fully mixed condition. The benefit of the mixer geometry in enhancing the mixing process is clearly shown by the reduced "core" length of the plume, typically about one nozzle diameter long, as compared to a classical, axisymmetric convergent nozzle where the core length is on the order of six to eight nozzle diameters long.

3. While the effect of the individual mixer geometric designs can be seen in the maximum centerline velocity and temperature values very near to the nozzle exit plane, i.e. at  $x/D$  values generally less than 1.0, the mixer individual "signature" effects are significantly reduced as the centerline decay values tend to merge for all mixers at  $x/D$  approaching 10.0 and are influenced by the global mixing effects dictated by energy conservation at the given BPR and total temperature ratio of the test condition.

4. The individual velocity and total temperature contours for all mixers show some general similarity as the contours are transformed by the mixing process with

increasing  $x/D$  position. In general, the profiles are symmetrical, from top to bottom, in the vertical measurement plane (as the "Y" value is traversed). Some symmetry anomalies were observed in the velocity profiles (in the "Z" plane) which may be due to bad probe data. Also, observed shifts in the maximum or centerline velocity and temperature values ('Y' value of 0.0) may be due to small misalignment between the hot nozzle and the plume rakes.

5. The plume survey data will be very useful in future comparisons to CFD results in evaluating the accuracy of predicted plume temperature and velocity profiles. Also, the plume data should be of value in the analysis of the corresponding acoustic data taken with each mixer. In particular, the velocity profiles at  $x/D$  of 0.2 may be useful in obtaining an integrated average velocity for use in correlating with the acoustic data. Further work should also be expended in comparison of this database with other published plume data for forced mixers, if available. This database may also be of use in the design of infra-red (I-R) suppression exhaust nozzles where rapid temperature mixing is required to reduce the I-R signature.



**Table I Test Conditions for Mixer Plume Tests**

Condition	NPR)core	NPR)fan	Tt)core/Tt)fan	Mn)FS = (M(fj))
Cycle F	1.39	1.44	2.34	0.2
Cycle G	1.54	1.61	2.62	0.2
Cycle H	1.74	1.82	2.79	0.2

**Table II 1995-96 Rolls-Royce Allison/NASA Mixers**

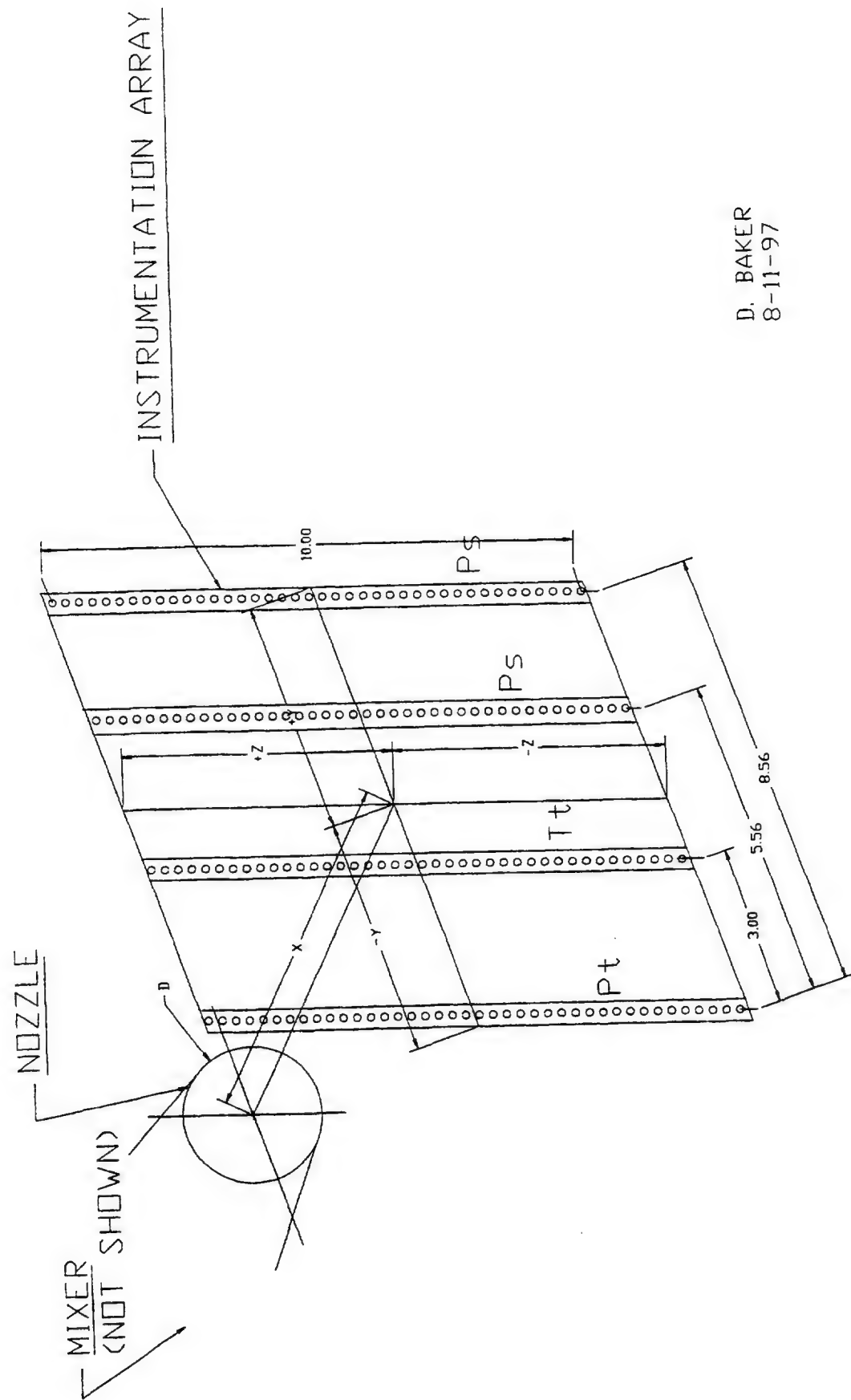
Mixer Description	Exhaust Nozzle Length	Comments
12 lobe baseline (12CL)	100%	With lobe sidewall cut-outs
12 lobe baseline (12CL)	50%	With lobe sidewall cut-outs
20 lobe deep-scalloped (20DH)	100%	Common lobe design
20 lobe deep-scalloped (20DH)	100%	Common lobe design
Internal tongue (12TH)	100%	12 pairs of tongues

**Table III Profile Comparison Examples**

Mixer/Nozzle	Test Condition	Figure
20 Lobe Deep /100% L (20DH)	1.39 NPR)core	10
12 Lobe B'Line/100% L (12CL)	1.39 NPR)core	12
12 Lobe B'Line/50% L (12CL)	1.39 NPR)core	13
Internal Tongue/100% L (12TH)	1.39 NPR)core	18



# FIGURE A TRAVERSING RAKE SKETCH & AXIS DEFINITION



D. BAKER  
8-11-97



Figure 1 Comparison of maximum (center-line) velocity decay for several mixers at TO#1 and  $M(fj) = 0.2$ .

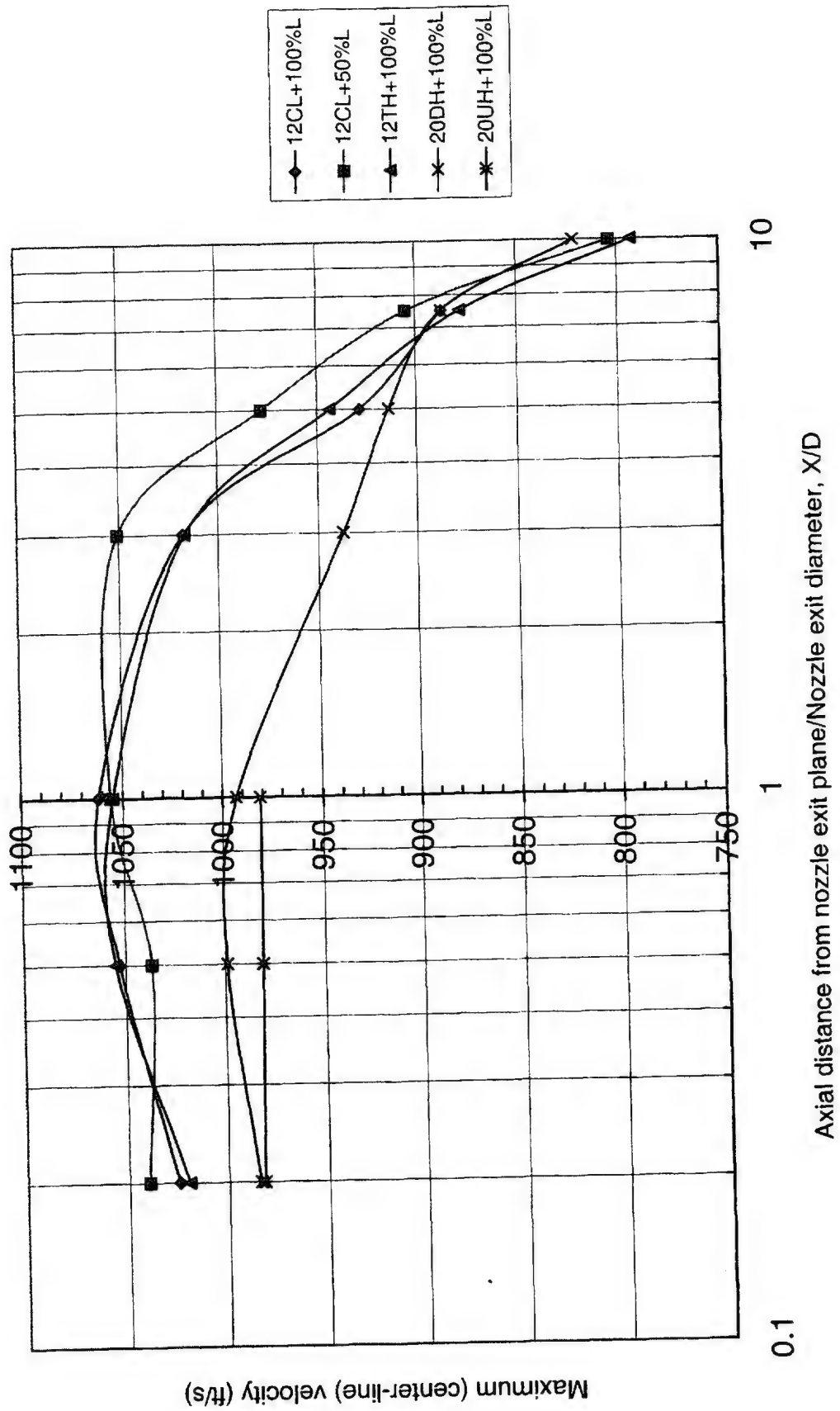




Figure 2. Comparison of maximum (center-line) velocity decay for 12CL and 20DH mixers at TO #2 and TO #3 at  $M(fj) = 0.2$

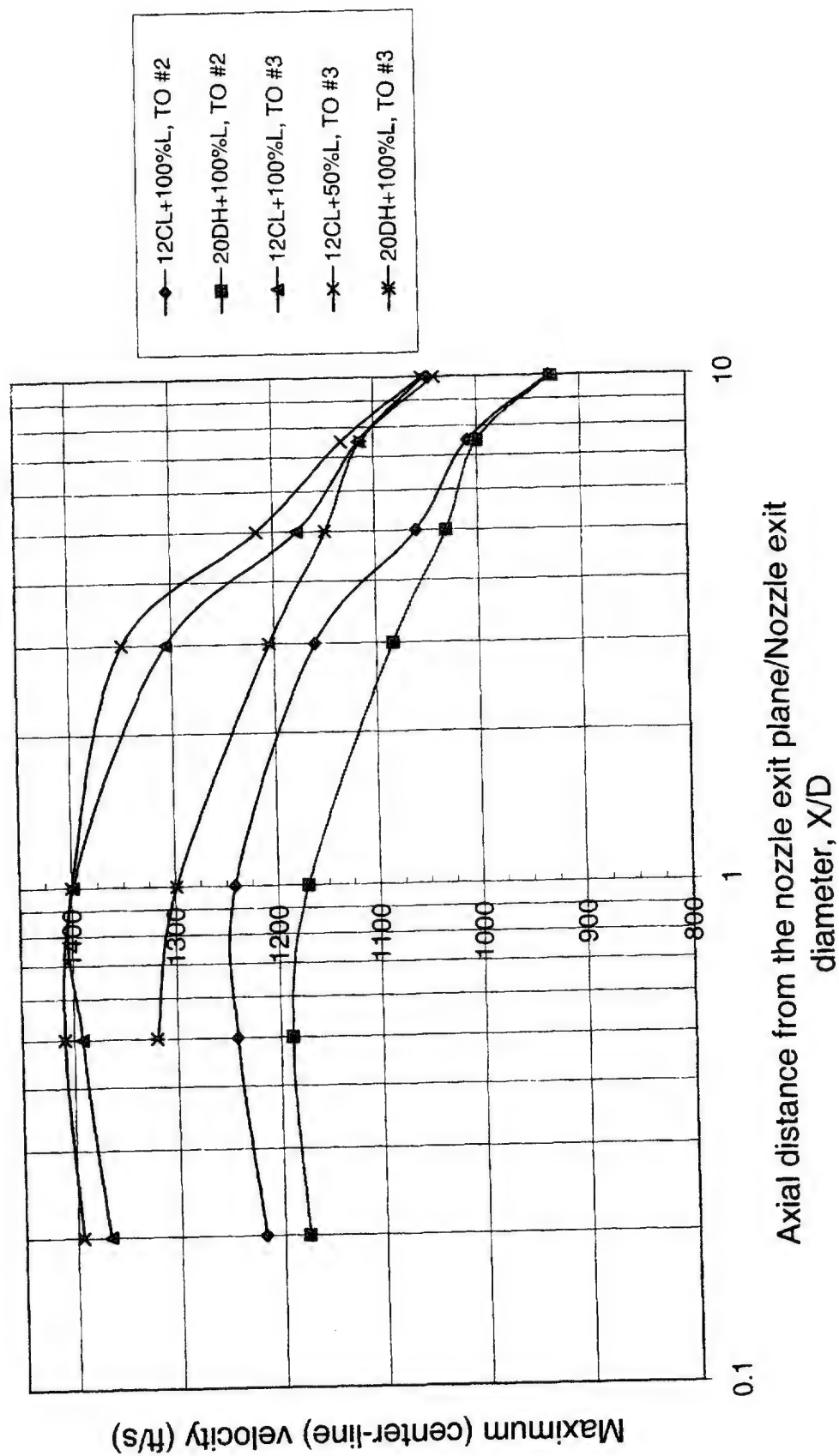




FIGURE 3

Internal Tongue Mixer - Maximum "Near Centerline" Plume Velocity Decay - 1996 Nasa Tests -  
100% Nozzle Length, 1.39 NPR)c, 1.44 NPR)f, 2.34 Tt)h/ Tt)c, 0.0 Mn)FS

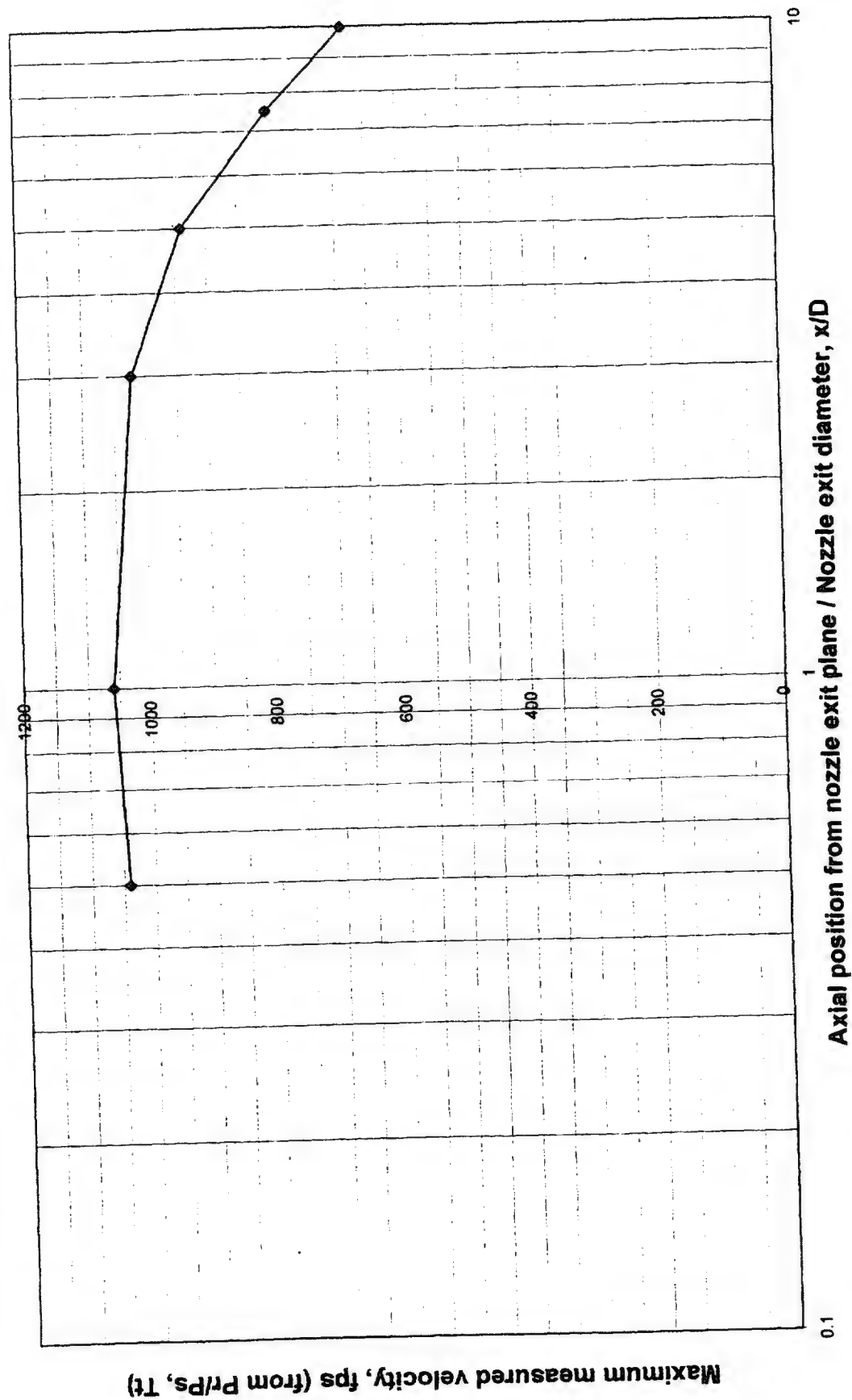




FIGURE 4

Maximum "Centerline" Velocity Decay, 20L Deep Mixer, 100% Nozzle Length, 1.54 NPR)core,  
 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests  
 Rdg #'s V547, V548, V549, V558, V561, V559, V560

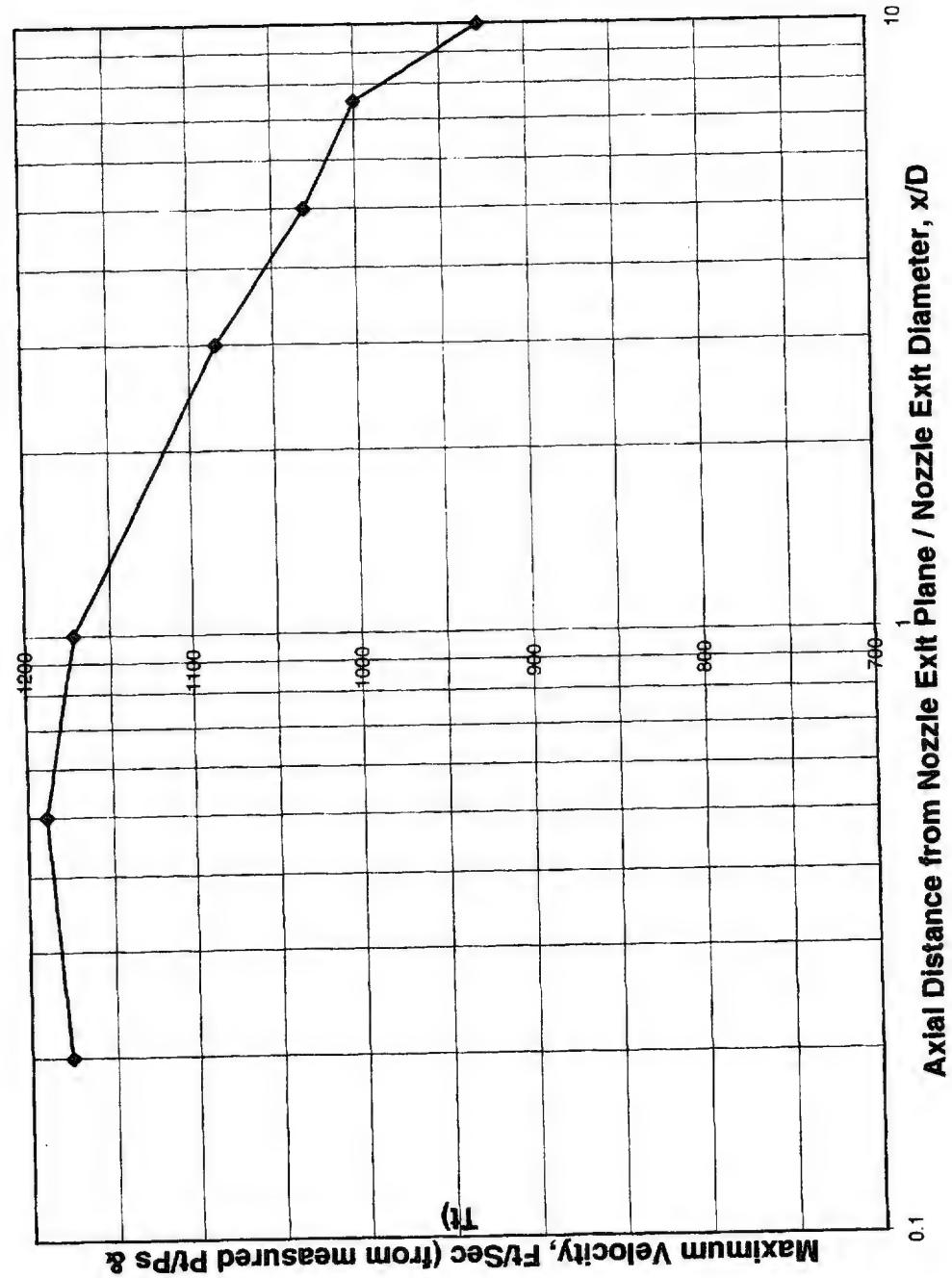




FIGURE 5

Maximum "Centerline" Velocity Decay, 12L Baseline Mixer with Cutouts, 100% Nozzle Length,  
 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core(Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic  
 Mixer/Plume Tests Rdg #'s V575, V573, V574, V572, V571, V570, V569

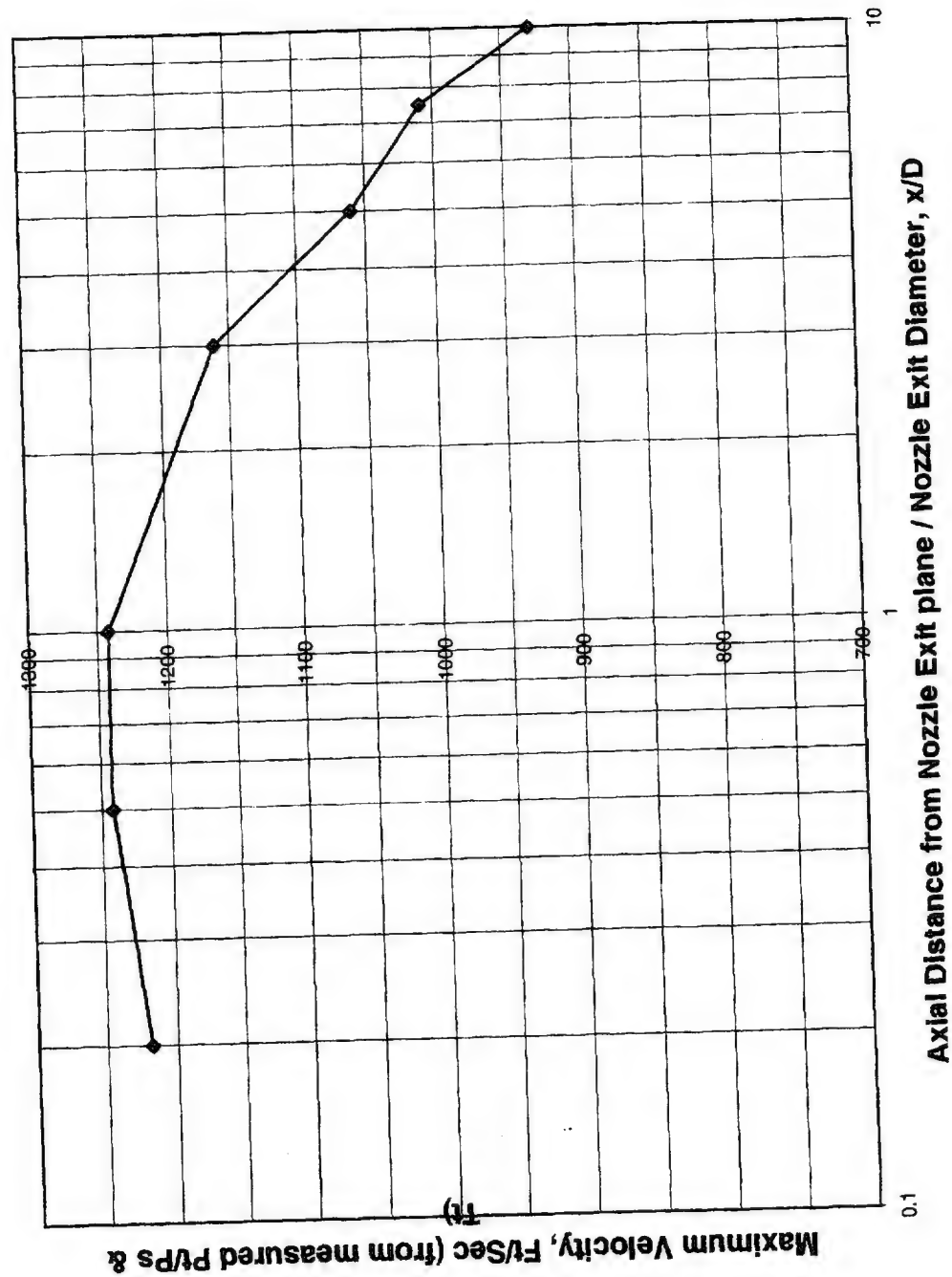




FIGURE 6

Maximum "Centerline" Velocity Decay - 20 Lobe Deep Scalloped Mixer - 100% Nozzle Length -  
1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS -Rdg #s V541 to V546 - 1996 NASA-  
LeRC Acoustic Mixer Plume Tests

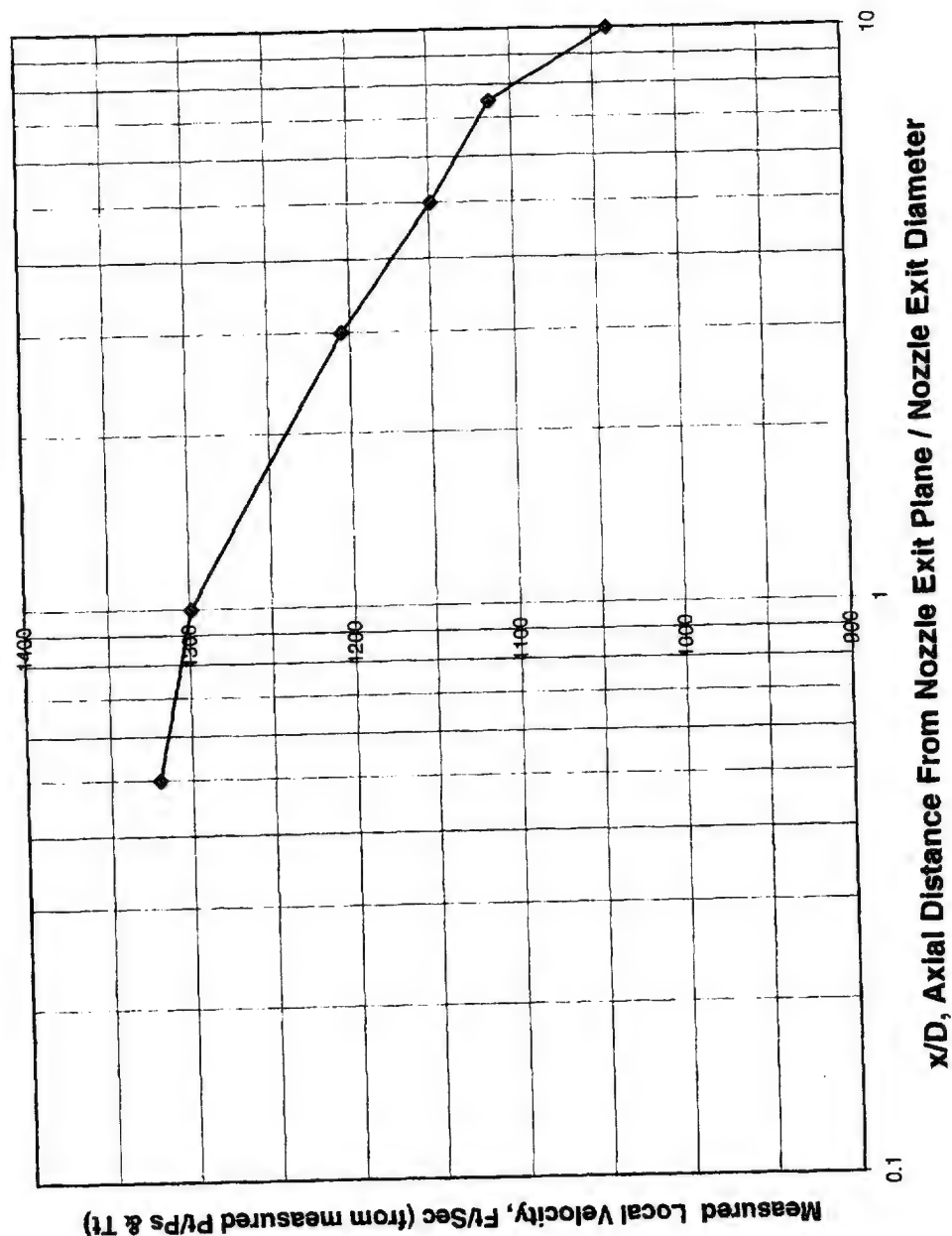
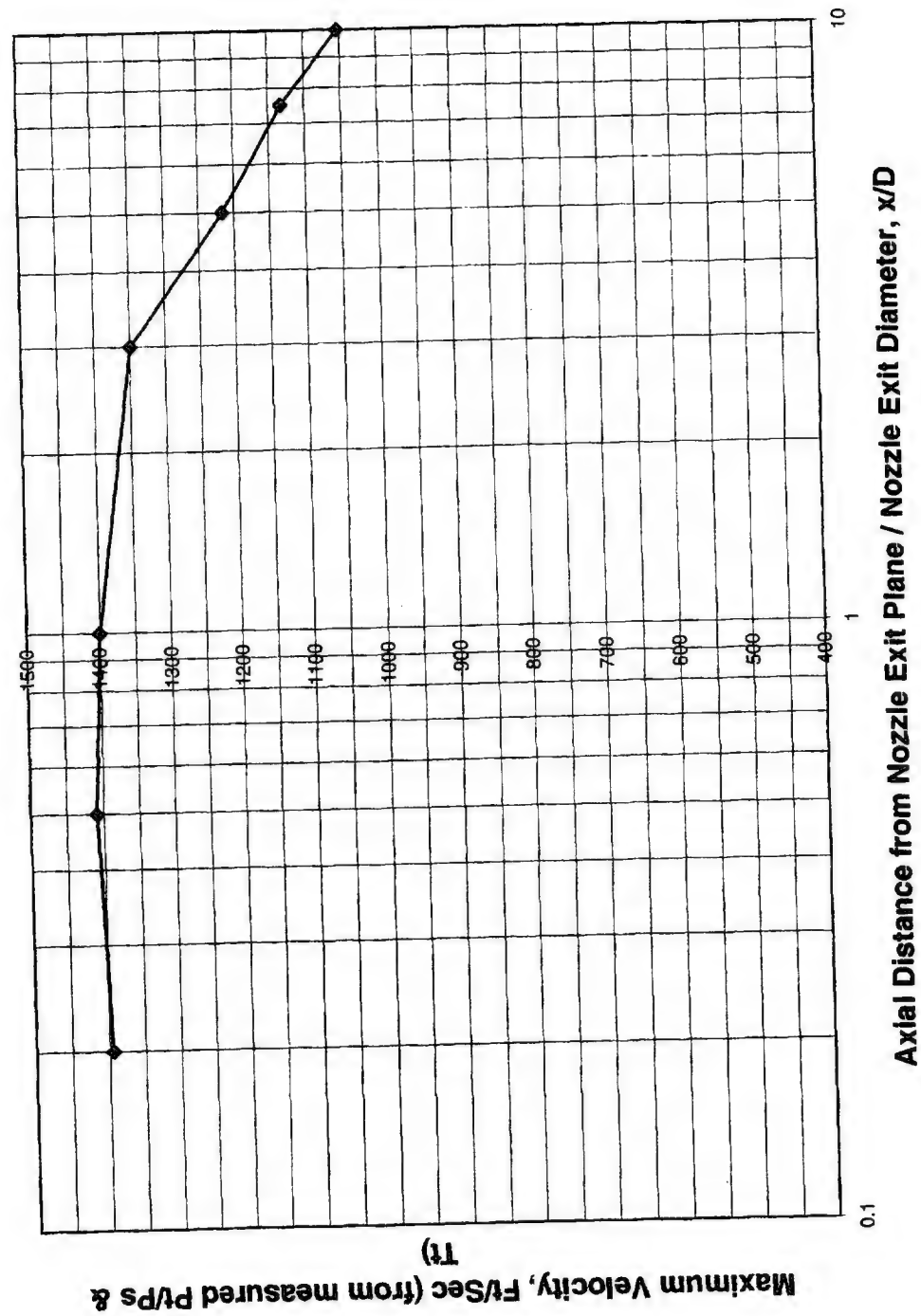




FIGURE 7

Maximum "Centerline" Velocity Decay, 12L Baseline Mixer w 50% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg #s V597 to V603





Maximum "Centerline" Velocity Decay, 12L Baseline Mixer w/ 100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg #s 576 to 582

FIGURE 8

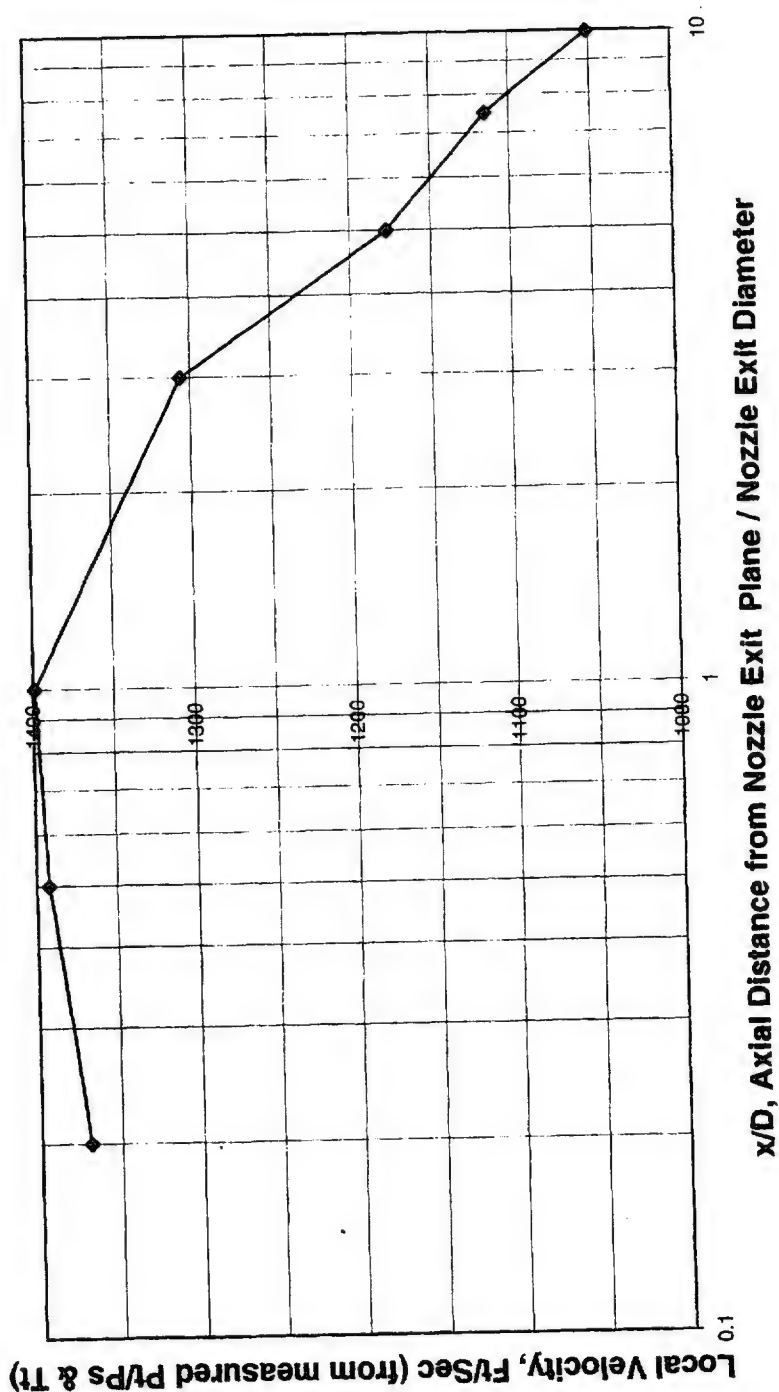




Figure 9. Vertical chordwise velocity profiles for 20DH mixer with 100% nozzle length at  $X/D=0.2$  for TO #1,  $M(fj) = 0.2$ .

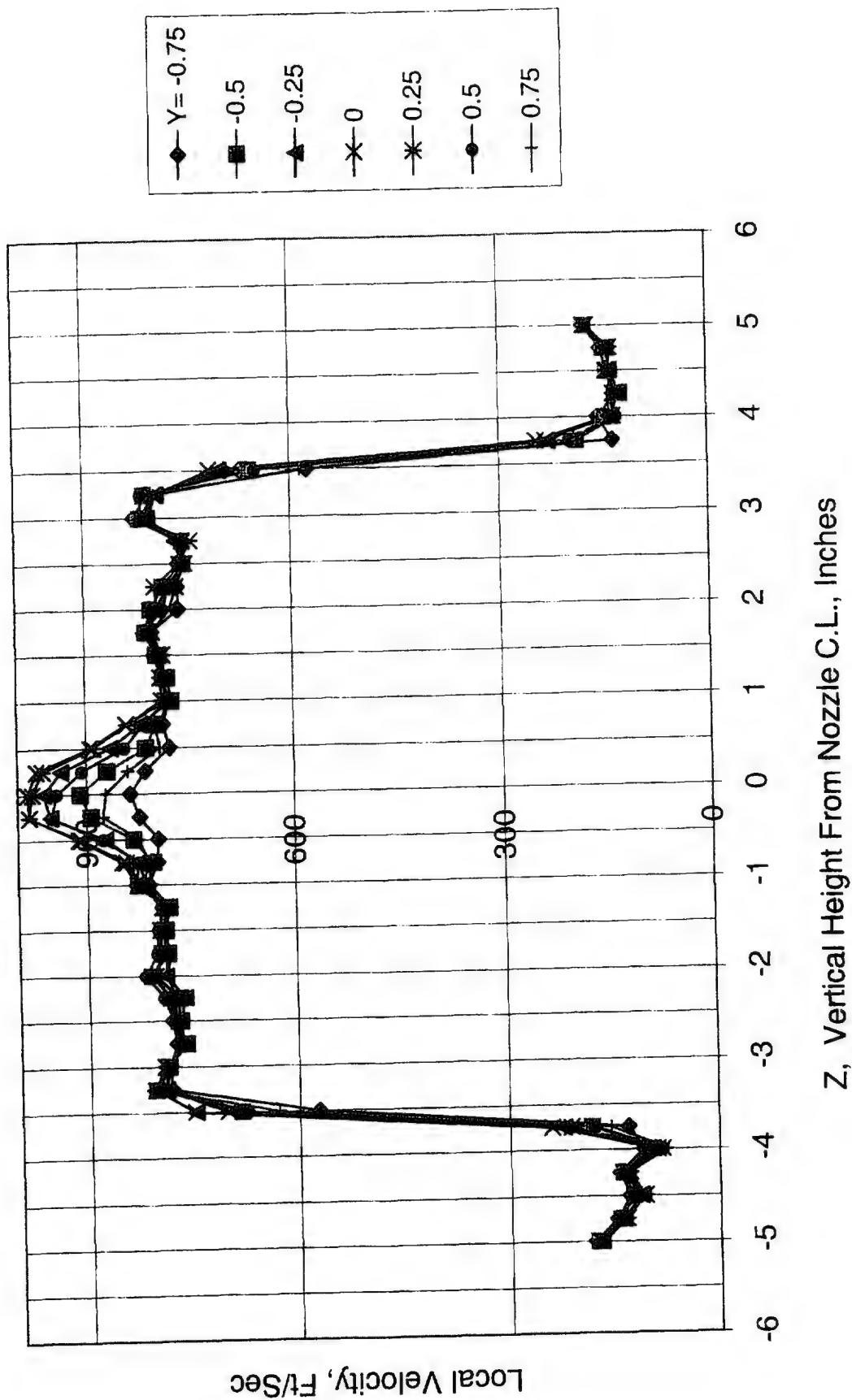




FIGURE 10

20L Deep Mixer Velocity Survey at  $x/D=0.2$ , NPR)core=1.39, NPR)fan=1.44,  
 $Tt)core/Tt)fan=2.34$ , Mn)FS= 0.2, 1996 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # V550

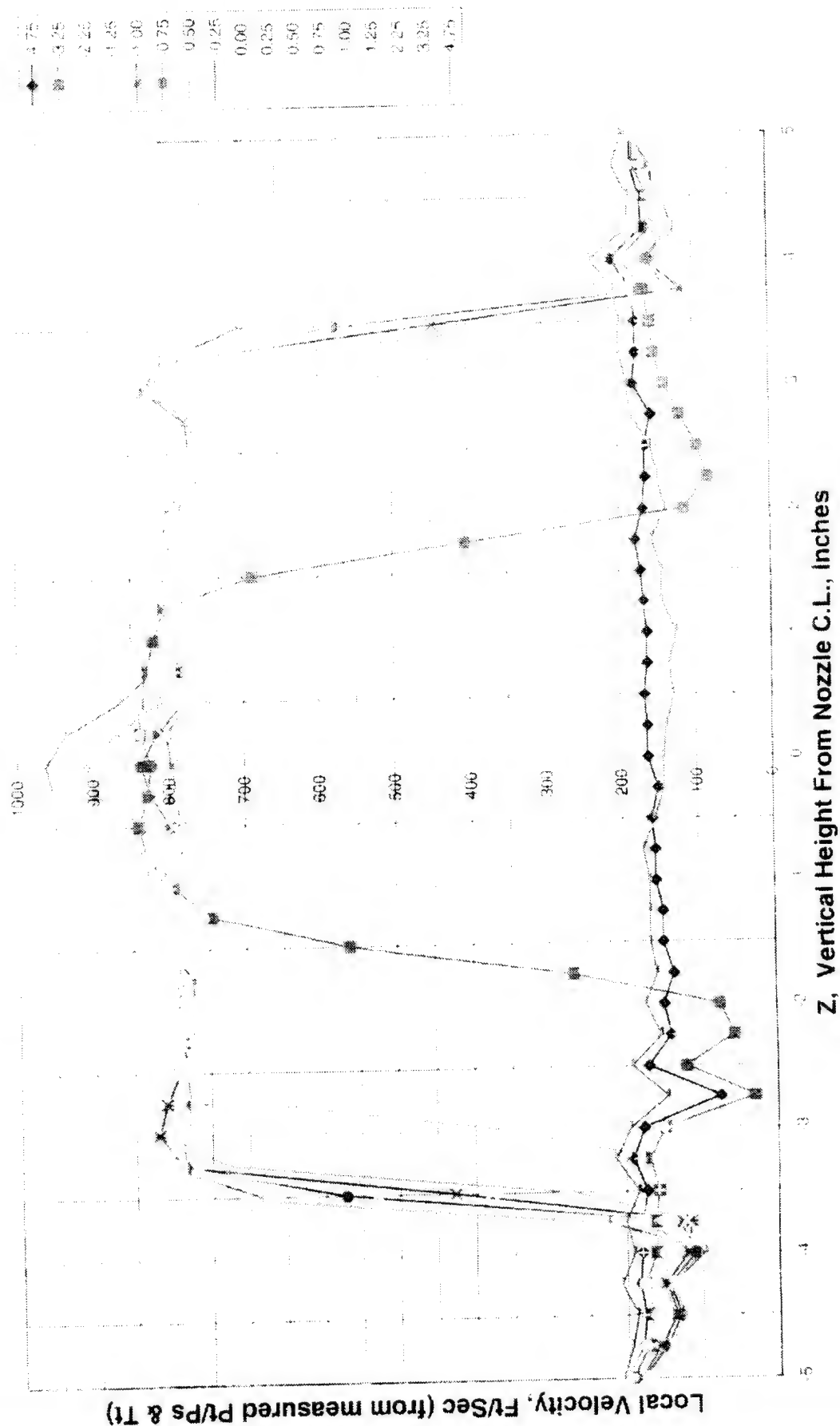




Fig 11(a). 20DH Mixer, 100%L, Velocity Contours at  $x/D = 0.2$  at TO #2,  $M(fj) = 0.2$

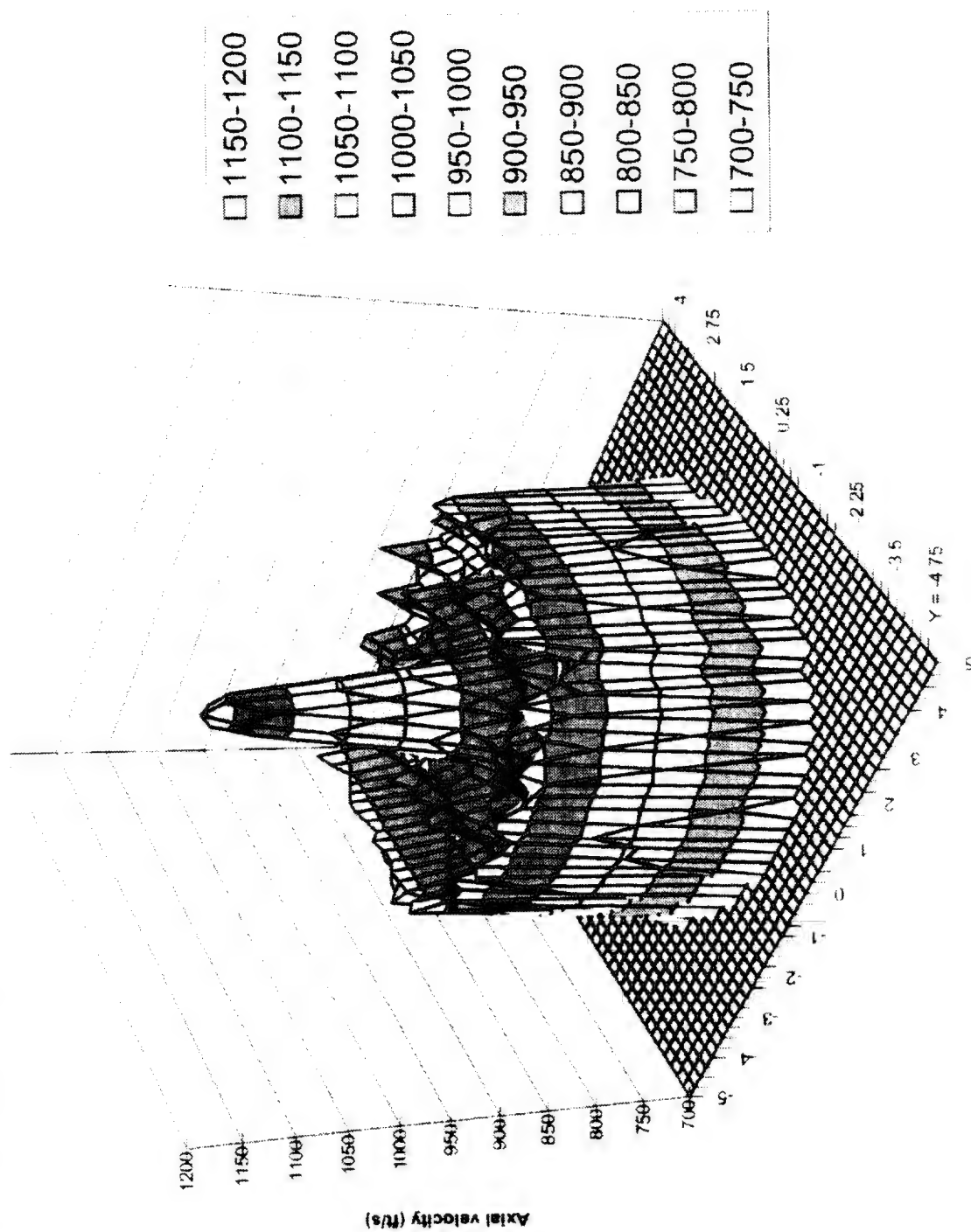




FIGURE 11(b)

20L Deep Mixer, 100% Nozzle Length, Velocity Survey at  $x/D=0.2$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V560

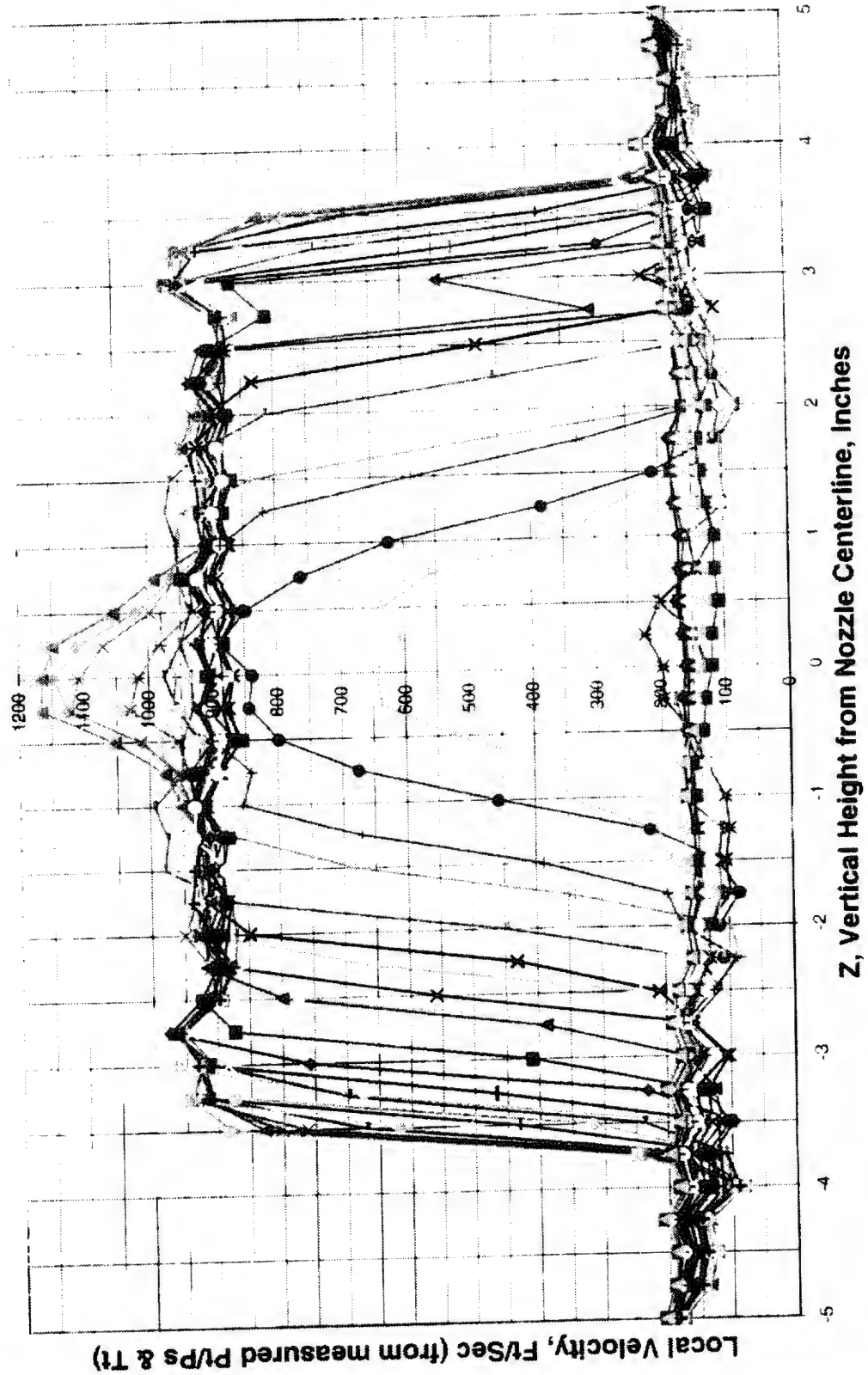




FIGURE 12

12L Baseline w/Cutouts - Velocity Distribution Across Plume at  $x/D = 0.2$ , NPR)core=1.39,  
NPR)fan=1.44, Tt)core/Tt)fan=2.34, 0.2 Mn)FS - 1996 NASA-LeRC Acoustic/Plume Mixer Tests -  
Rdg # V562

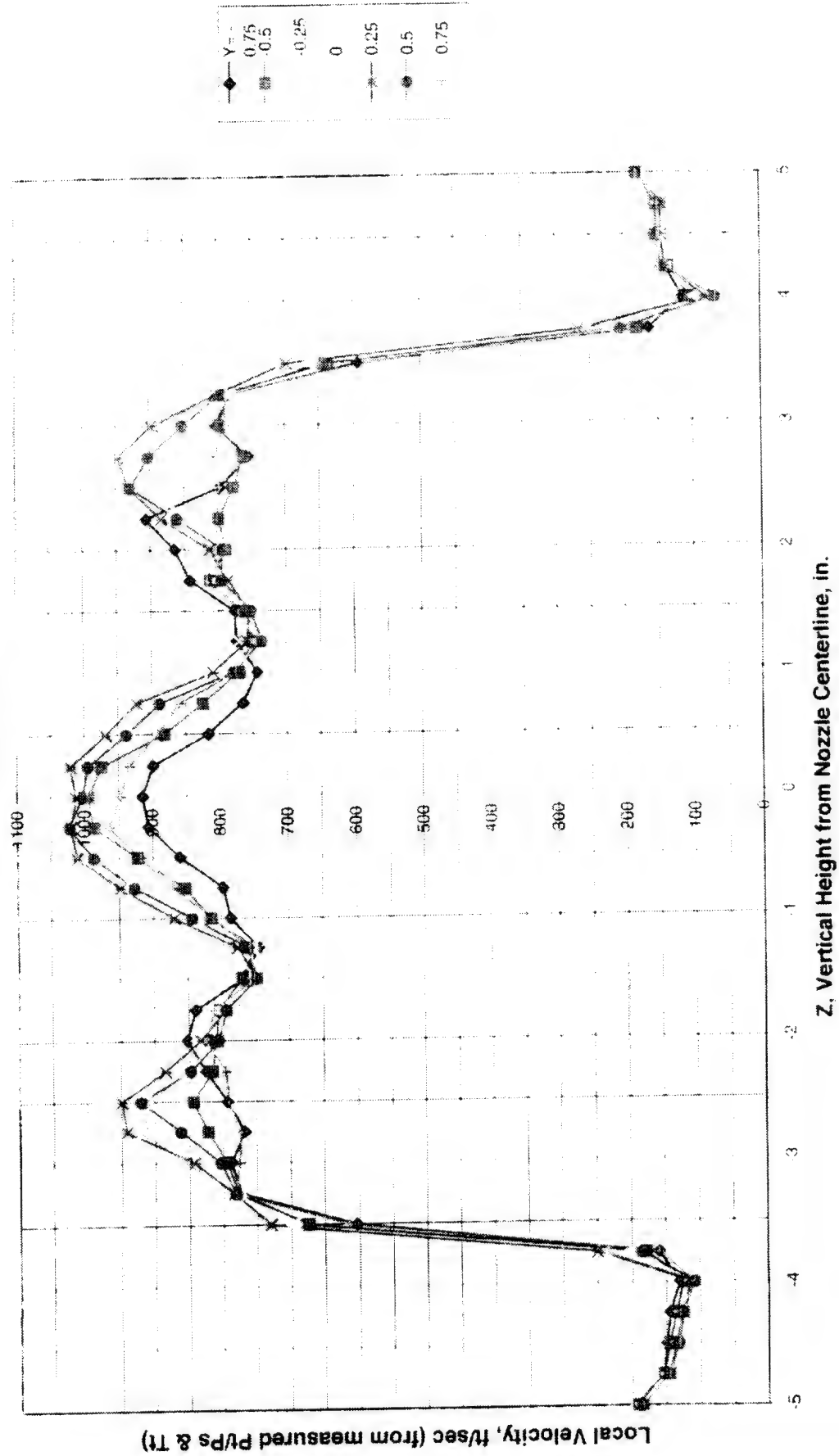




FIGURE 13

12 Lobe w/cutouts, 50% Nozzle Length - Velocity Distribution Across Plume at  $x/D=0.2$ ,  
 NPR)core=1.39, NPR)fan=1.44, Tt)core=2.37, 0.2 Mn)FS - 1996 NASA LeRC Acoustic  
 Mixer/plume Tests - Rdg# V583

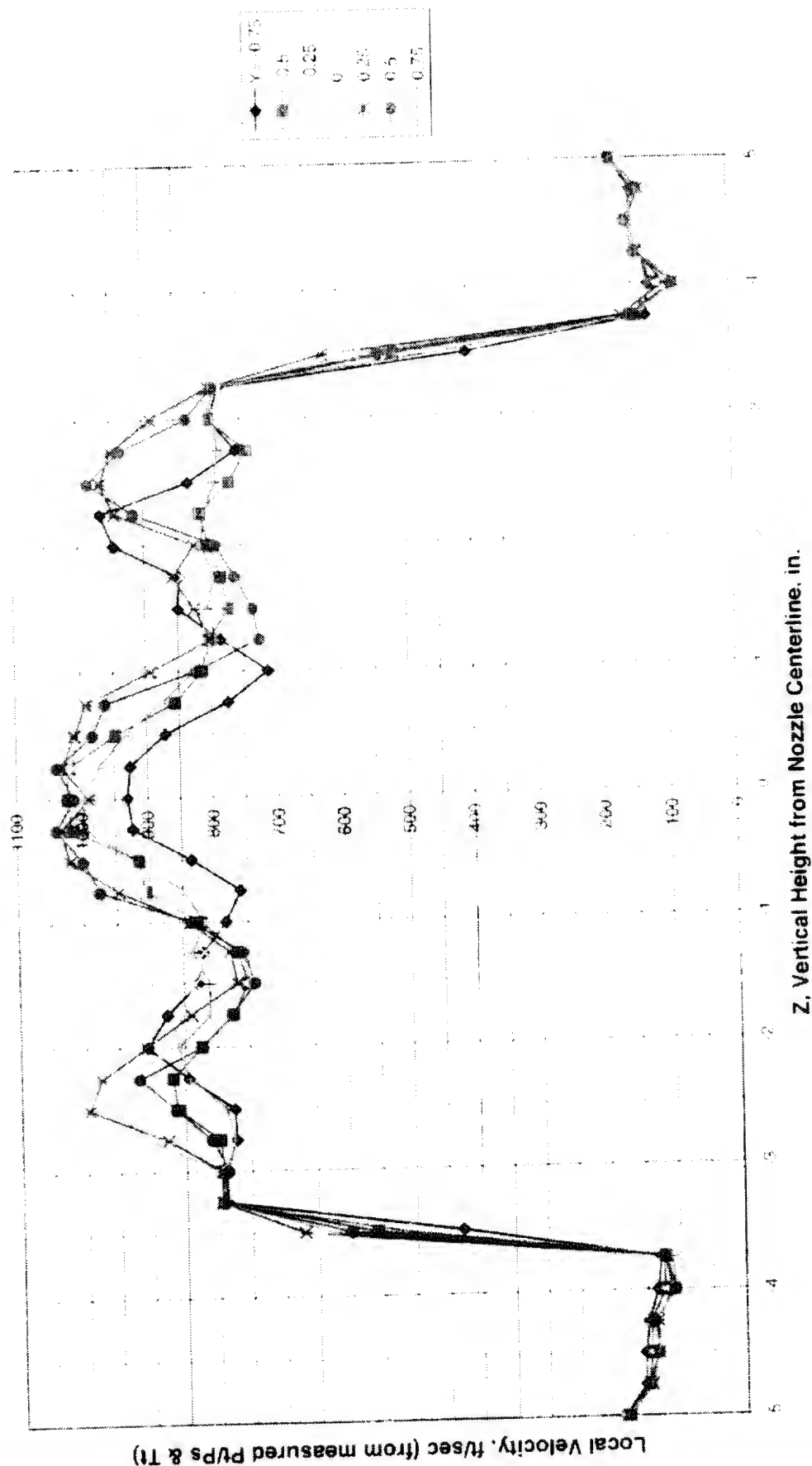




Figure 14(a). 12L Baseline Mixer (12CL) w/50% Nozzle Length Velocity Survey at  $x/D=0.2$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg# V596

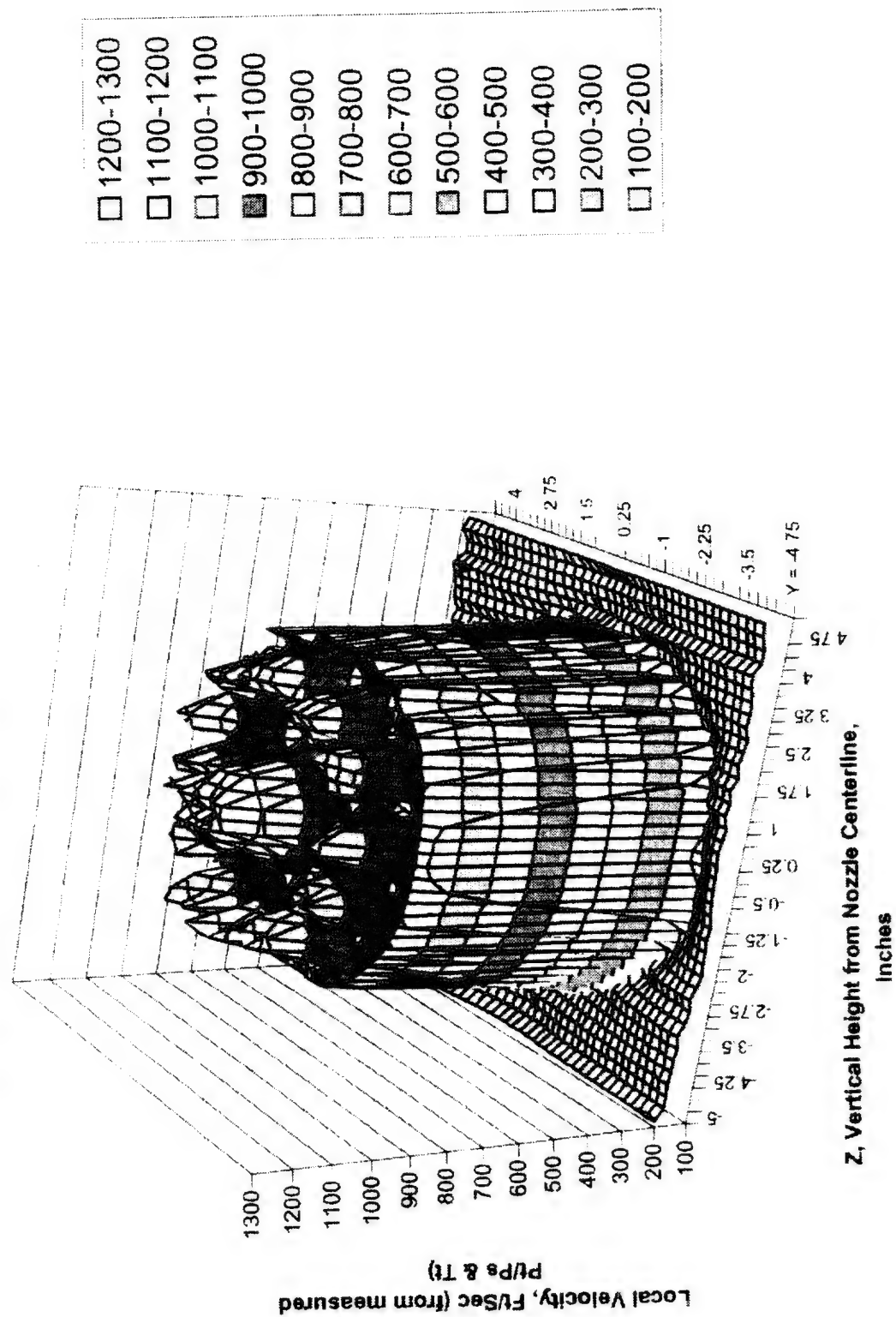




FIGURE 14(b)

12L Baseline Mixer w/50% Nozzle Length Velocity Survey at  $x/D=0.2$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg# V596

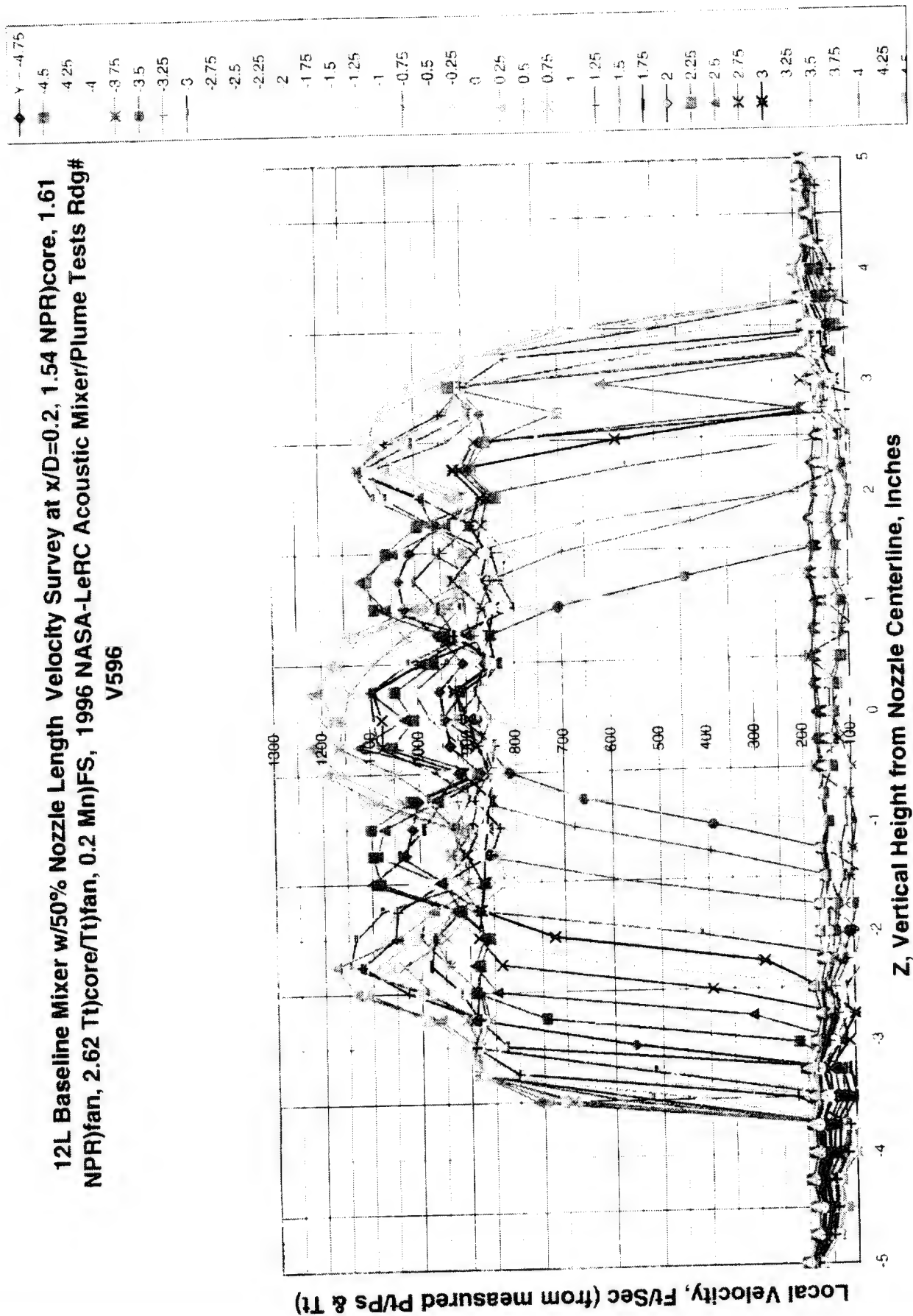




Figure 15(a). 12L Baseline with Cutouts (12CL), 100% Nozzle Length, Velocity Survey @  $x/D=0.2$ ,  
 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic  
 Mixer/Plume Tests Rdg # V575

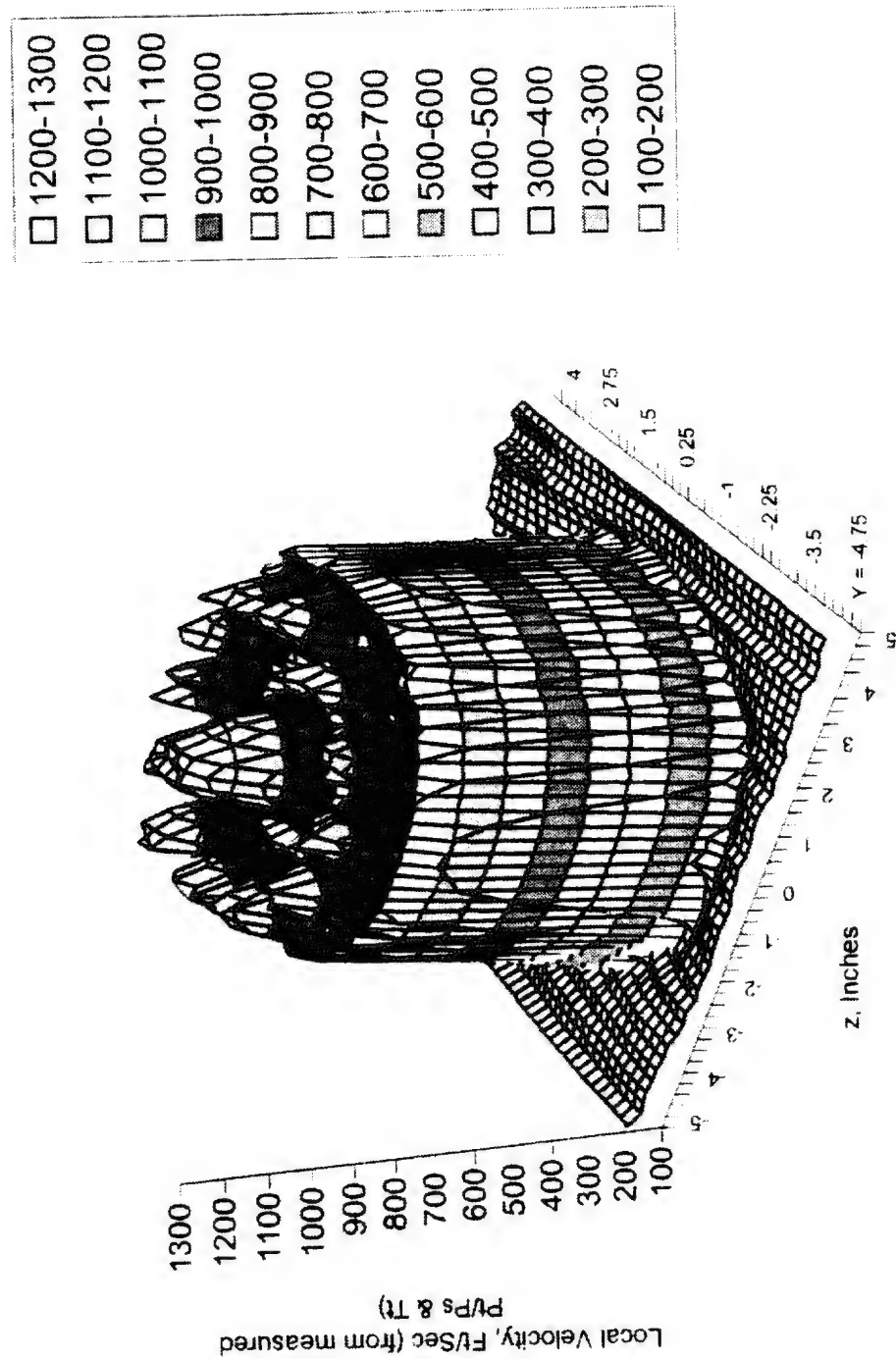




FIGURE 15(b)

12L Baseline with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=0.2$ , 1.54 NPR)core,  
 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests  
 Rdg # V575

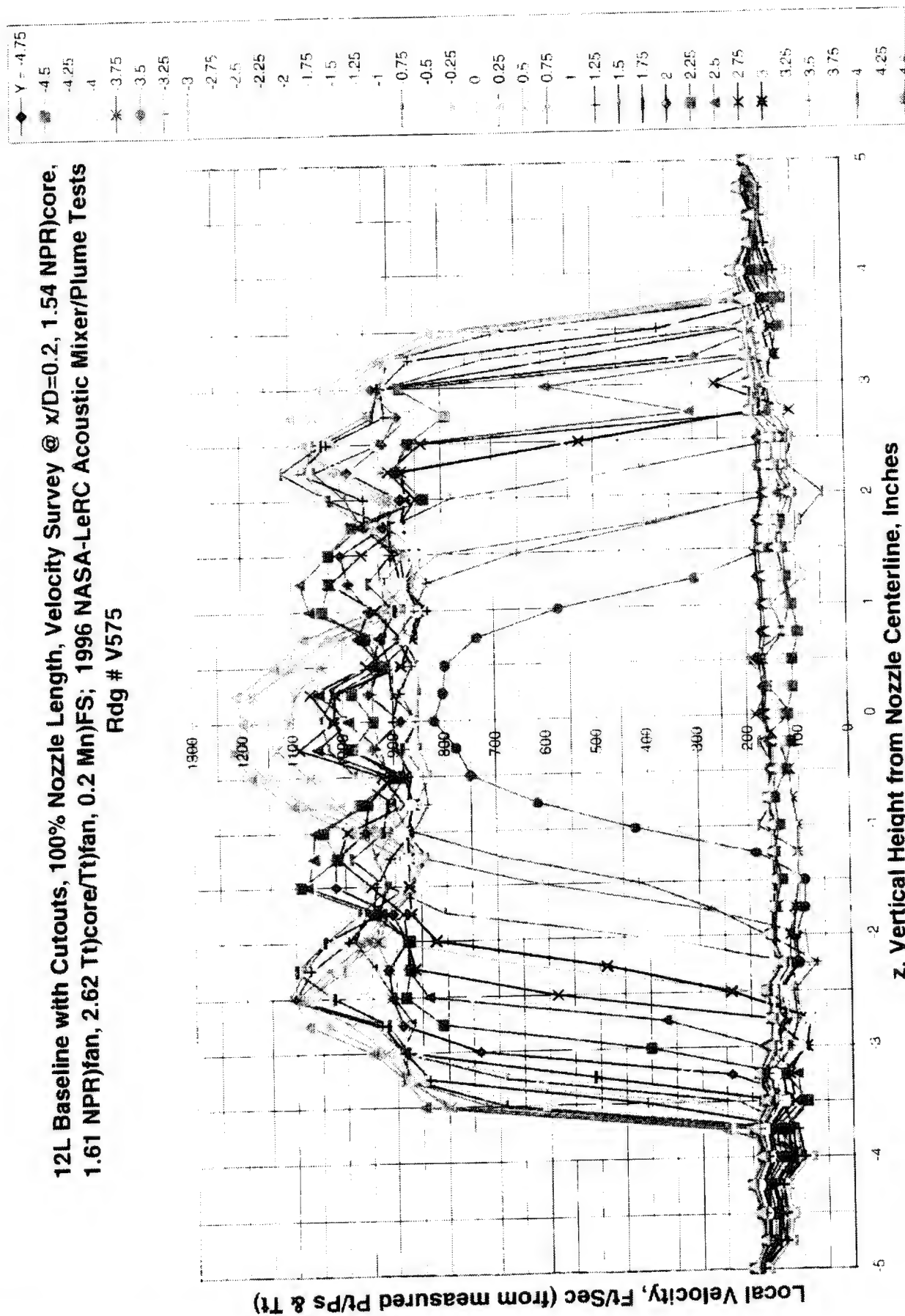




Figure 16(a). Velocity profiles for 12CL mixer with 50% nozzle length at  $X/D = 0.2$  for TO #3 at  $M(fj) = 0.2$ .

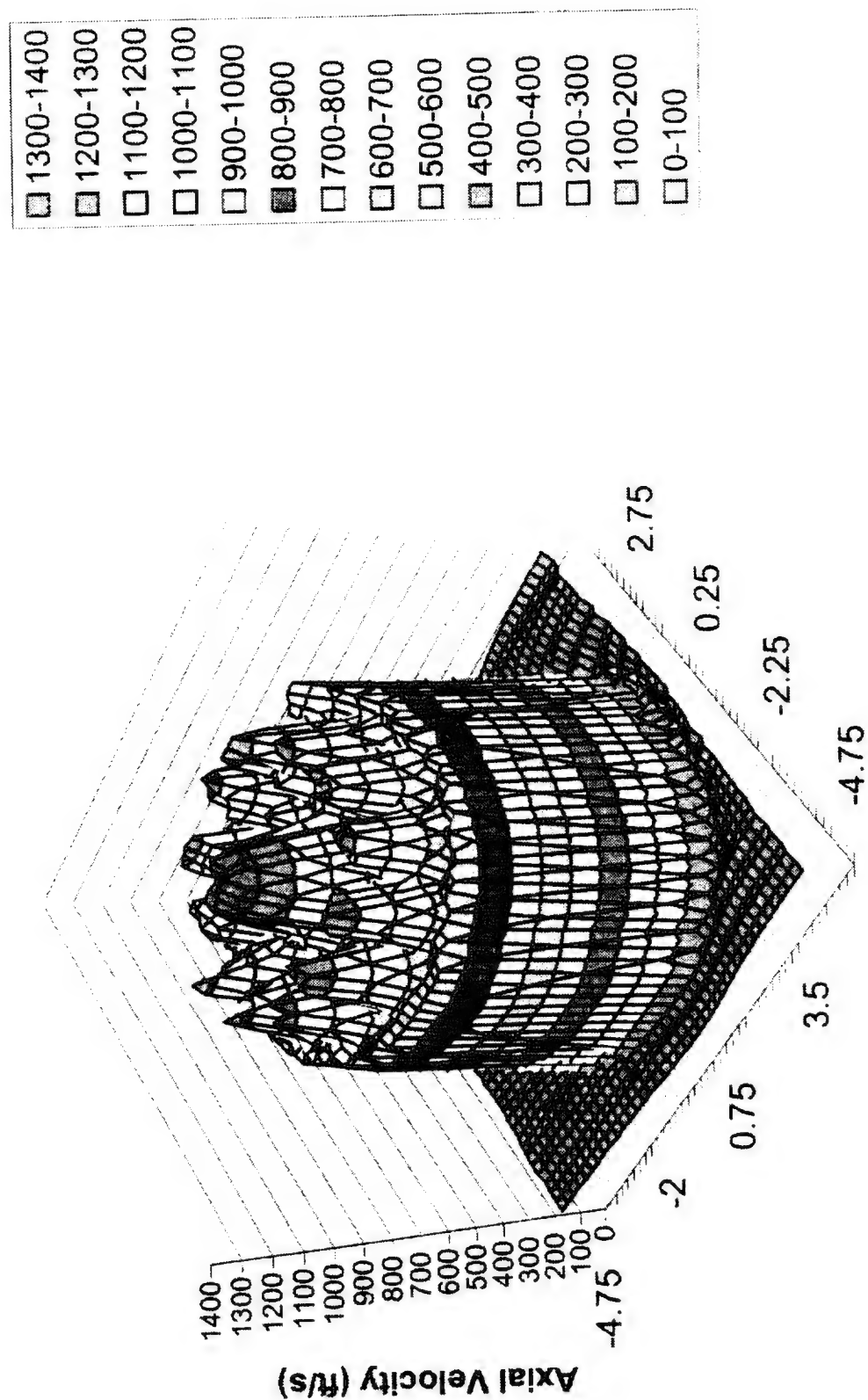




FIGURE 16(L)

12L Baseline Mixer w/50% Nozzle Length Velocity Survey at  $x/D=0.2$  (with some Y values removed for clarity); 1.82 NPR)fan, 0.2 Mn)FS, 2.79 Tt)core/Tt)fan, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg #V597

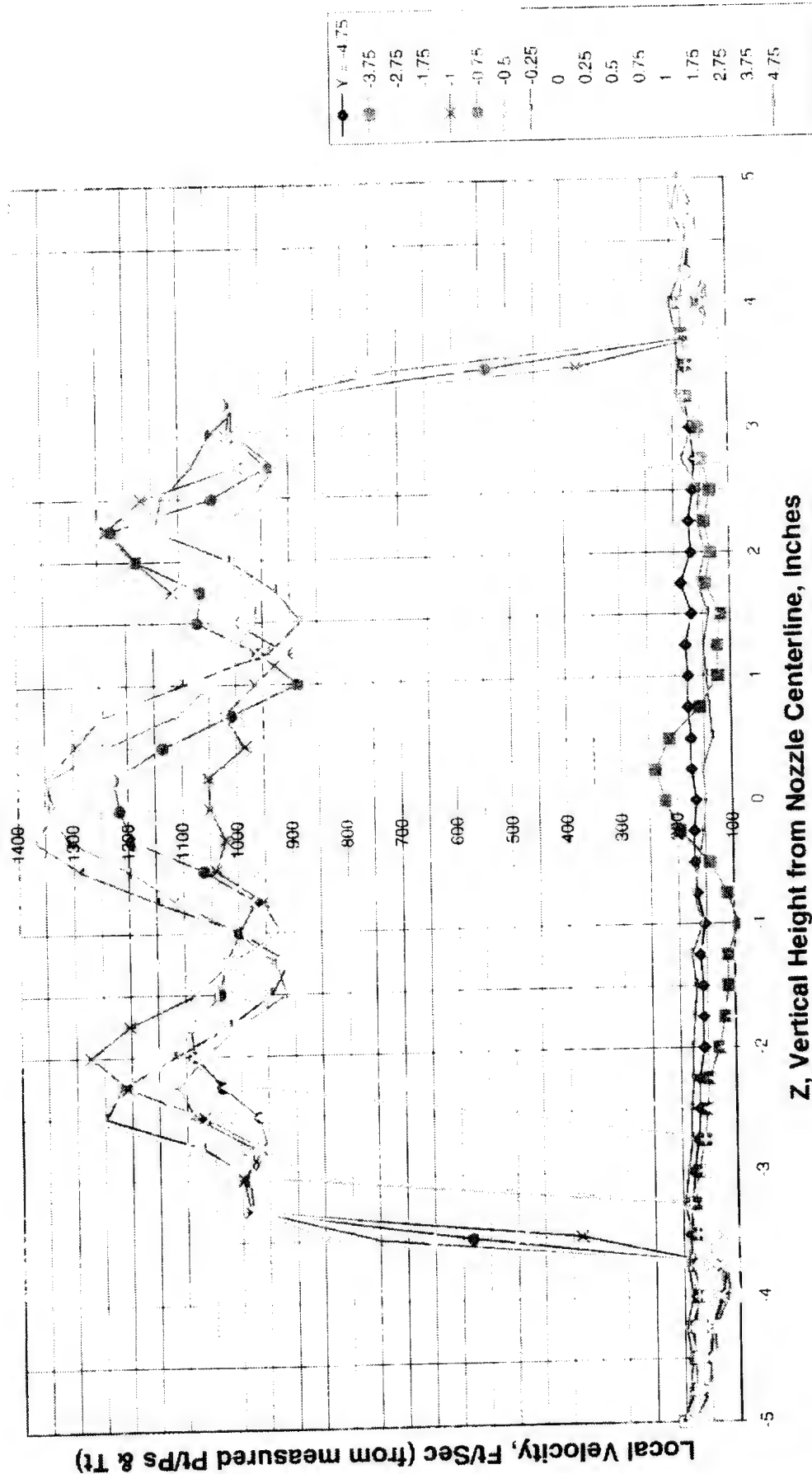




Figure 17 (a). 12L Baseline Mixer (12CL) w/100% Nozzle Length. Velocity Survey at  $x/D=0.2, 1.74$   
 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS. 1996 NASA-LeRC Acoustic Mixer/Plume  
 Tests Rdg # V576

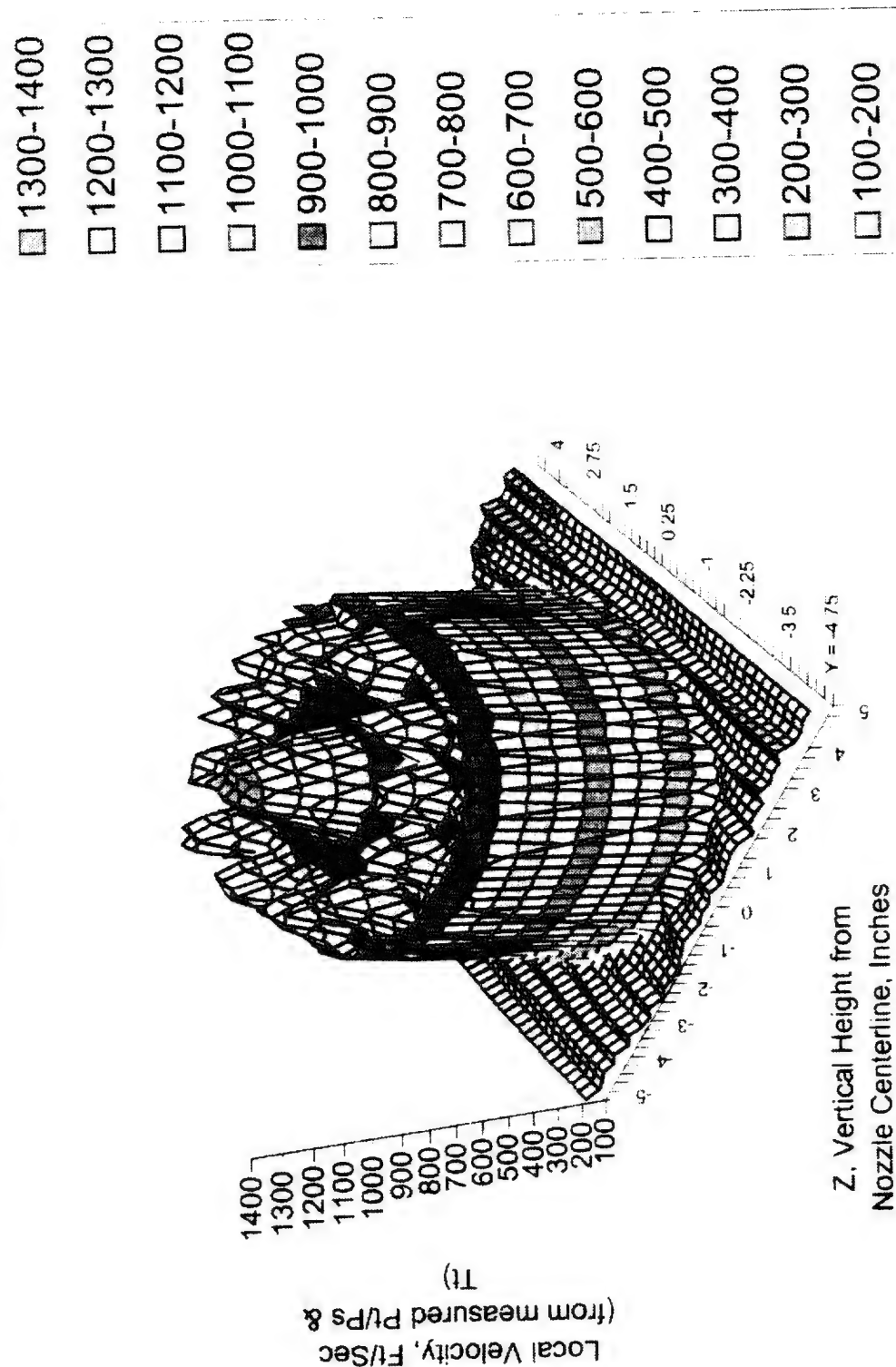




FIGURE 17(b)

12L Baseline Mixer w/100% Nozzle Length, Velocity Survey at  $x/D=0.2$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core(Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V576

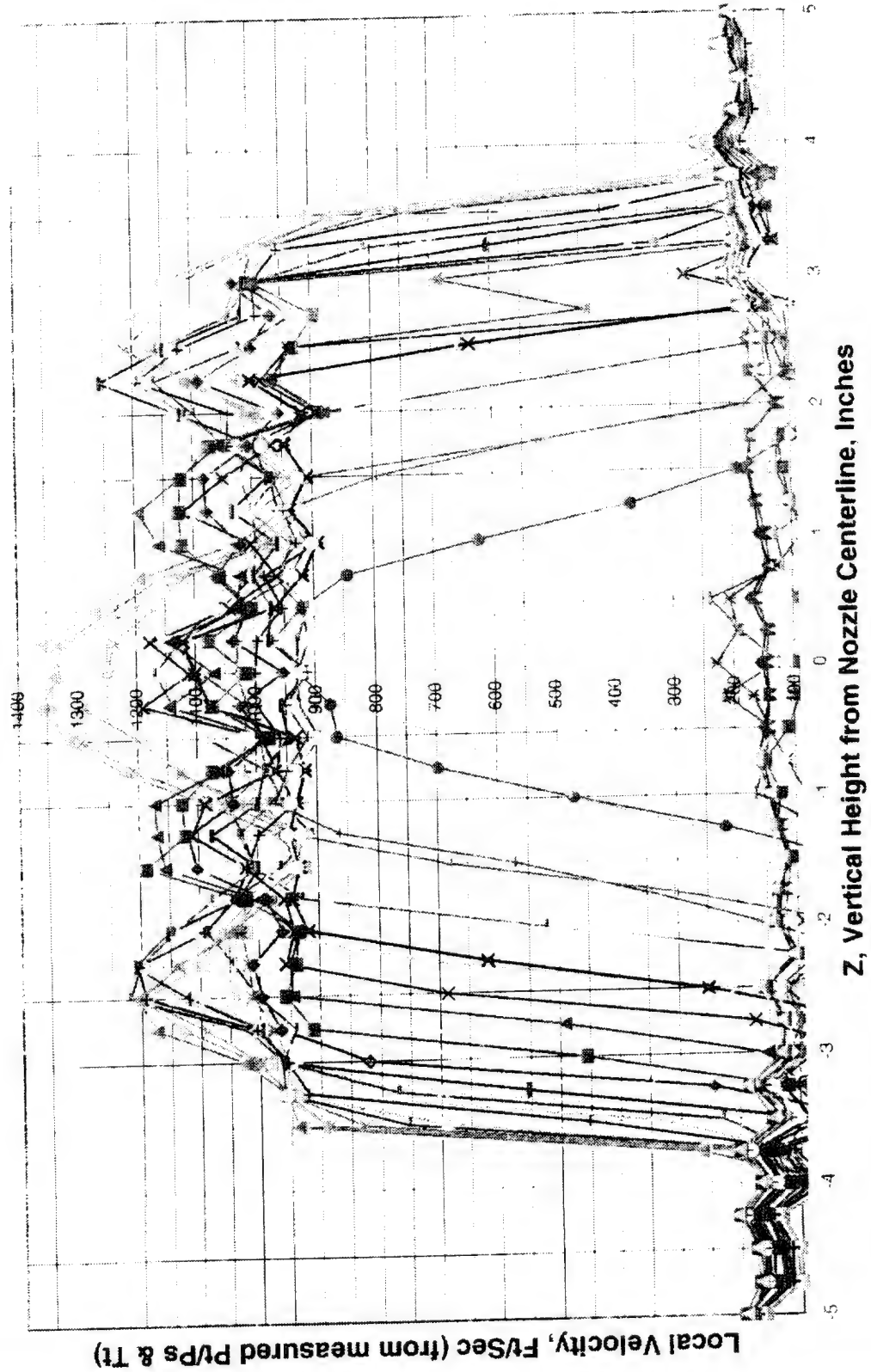




FIGURE 18

12P Internal Tongue - Velocity Distribution Across Plume at  $x/D=0.2$ , NPR)core=1.39,  
NPR)fan=1.44, Tt)core/Tt)fan=2.34, 0.2 Mn)FS - 1996 NASA-LeRC Acoustic Mixer/Plume Tests,  
Rdg# V512

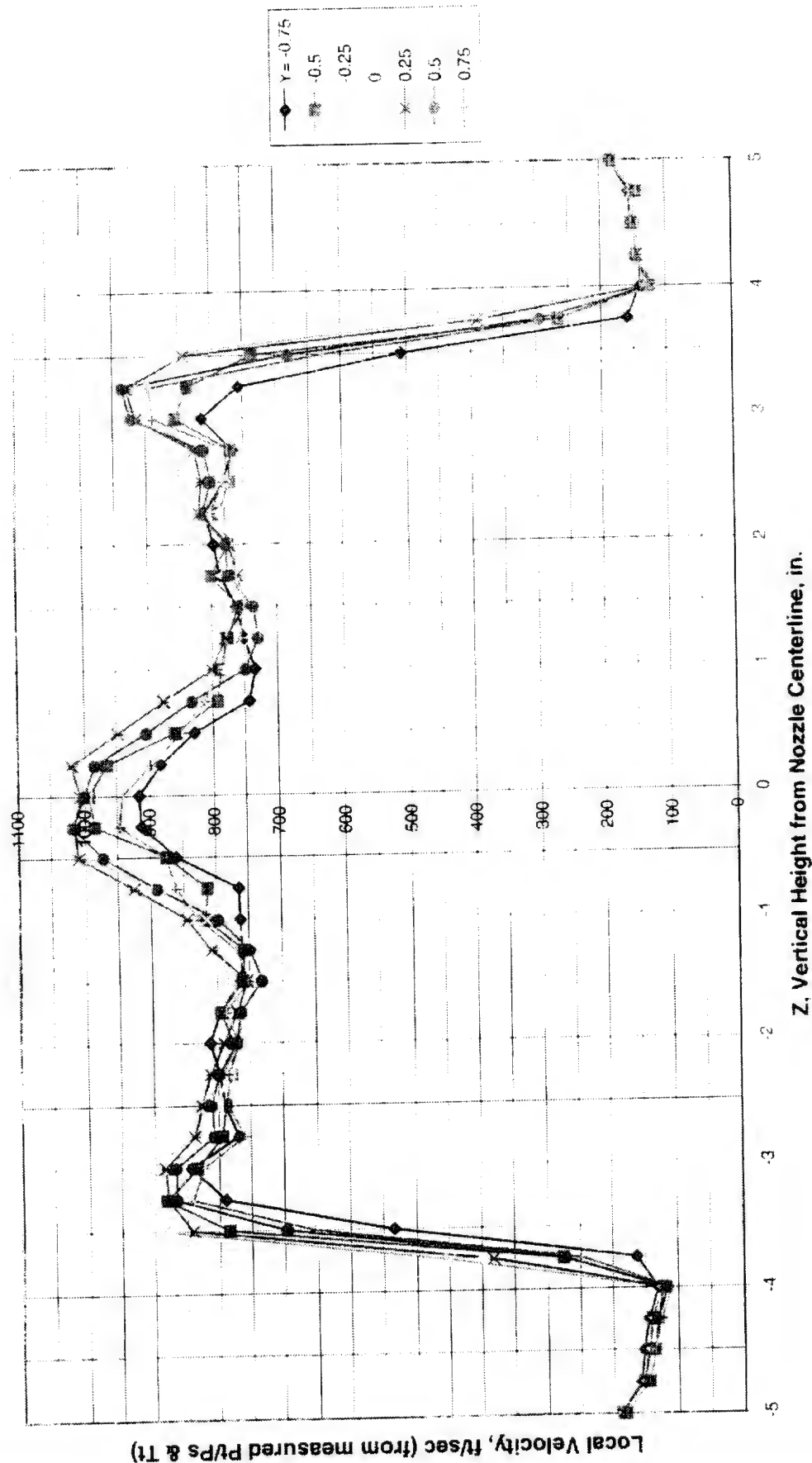




FIGURE 19

20L Deep Mixer - Velocity Distribution Across Plume at  $x/D=1.0$ , NPR)core=1.39,  
NPR)fan=1.44, Tt)core/Tt)fan=2.34, 0.2 Mn)FS - 1996 NASA-LeRC Acoustic Mixers/Plume Test  
Rdg# V552

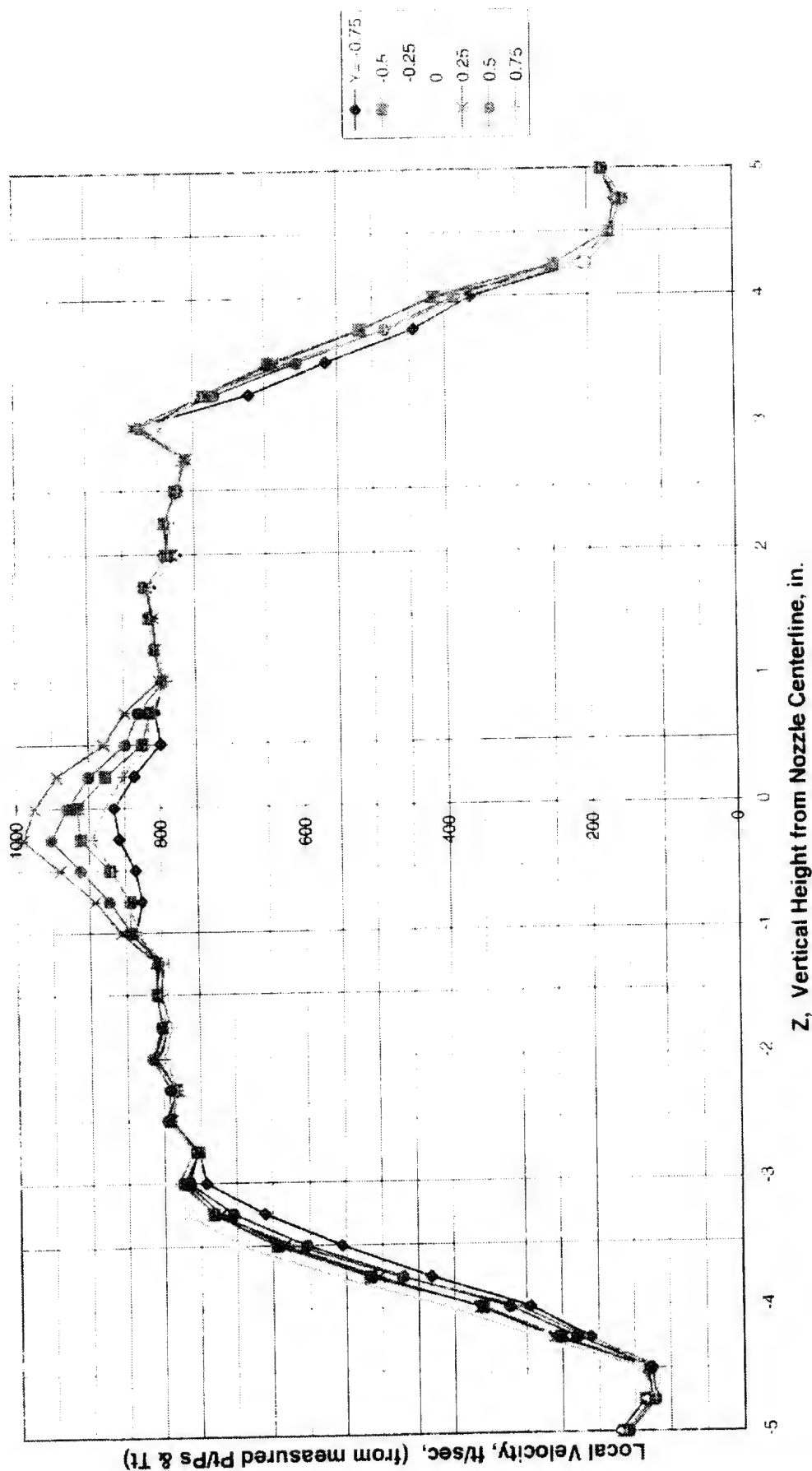




FIGURE 20

12 Lobe Baseline w/Cutouts - Velocity Distribution Across Plume at  $x/D=1.0$ , NPR)core=1.39,  
NPR)fan=1.44, Tt)core/Tt)fan=2.35, 0.2 Mn)FS - 1996 NASA-LeRC Acoustic/Plume Mixer Tests,  
Rdg # V563

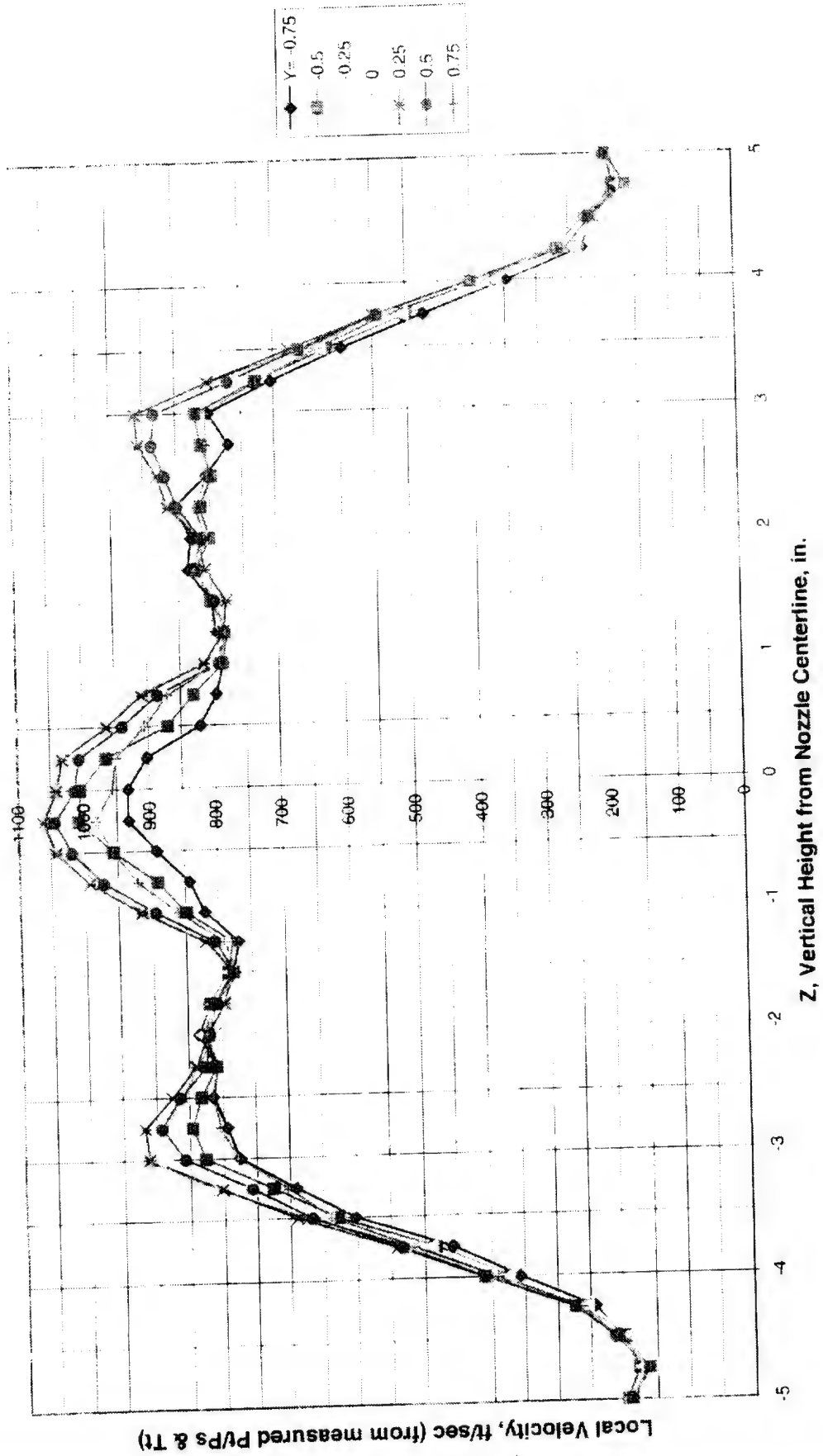




Figure 21(a). Velocity Profiles at  $x/D=1.0$ , 20L Deep Scalloped Mixer (20DH) w/100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan 2.79 Tt)core/Tt)fan, Rdg# V541 - 1996 NASA-LeRC Acoustic Mixer/Plume Test Rdg# V541

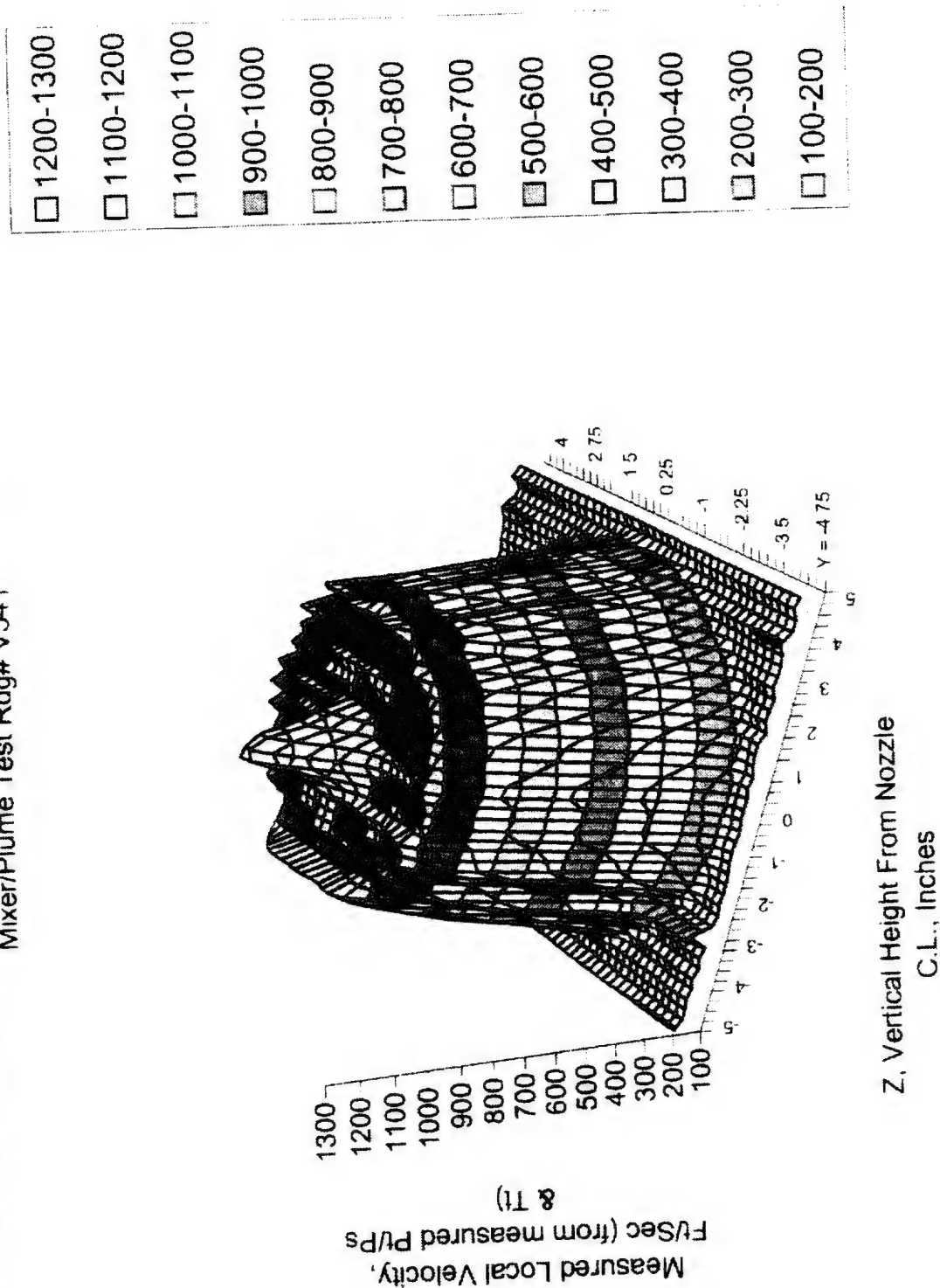




FIGURE 21(b)

Velocity Profile at  $x/D=1.0$ , 20L Deep Scalloped Mixer w/100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan 2.79 Tt)core/Tt)fan, Rdg# V541 - 1996 NASA-LeRC Acoustic Mixer/Plume Test Rdg# V541

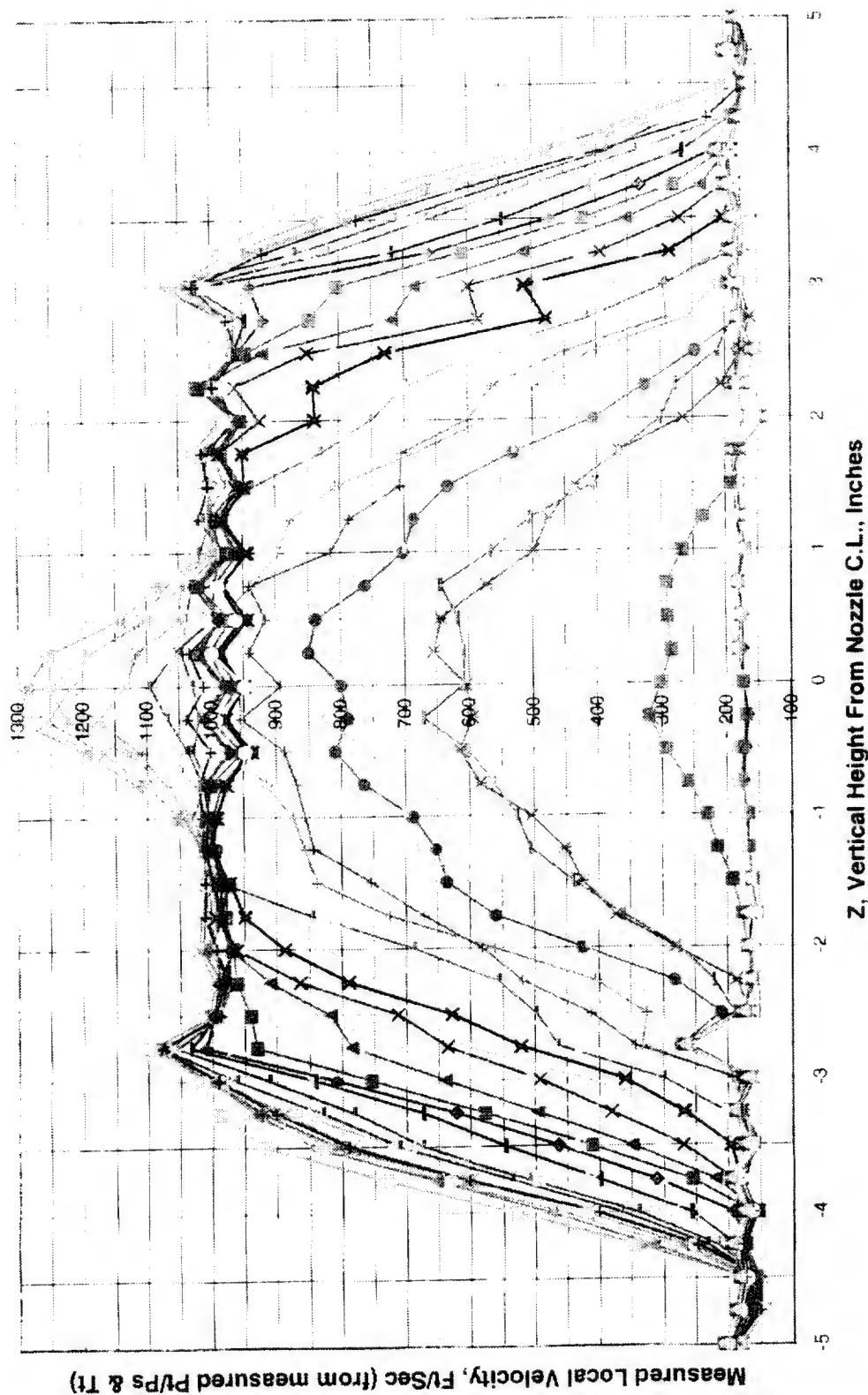




FIGURE 22

12L Baseline Mixer w/50% Nozzle Length Velocity Survey at  $x/D=1.0$ , 1.74 NPR)core, 1.82 NPR)fan, 0.2 Mn)FS, 2.79 Tt)core/Tt)fan, 1966 NASA-LeRC Acoustic Mixer/Plume Tests Rdg# V599

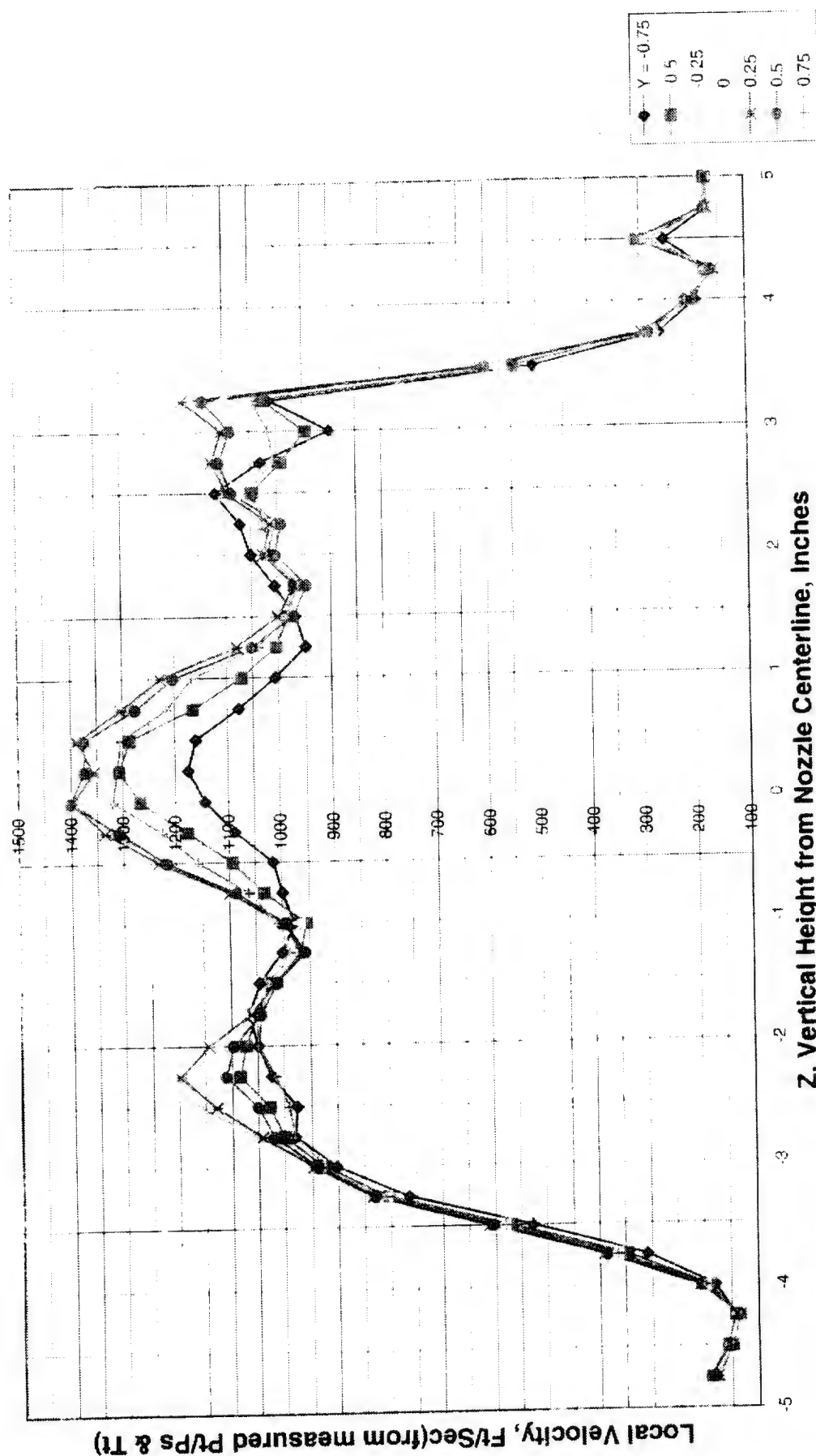




Figure 23(a). 12L Baseline Mixer (12CL) w/100% Nozzle Length, Velocity Survey at  $x/D=1.0$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Ti)core/Ti)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V577

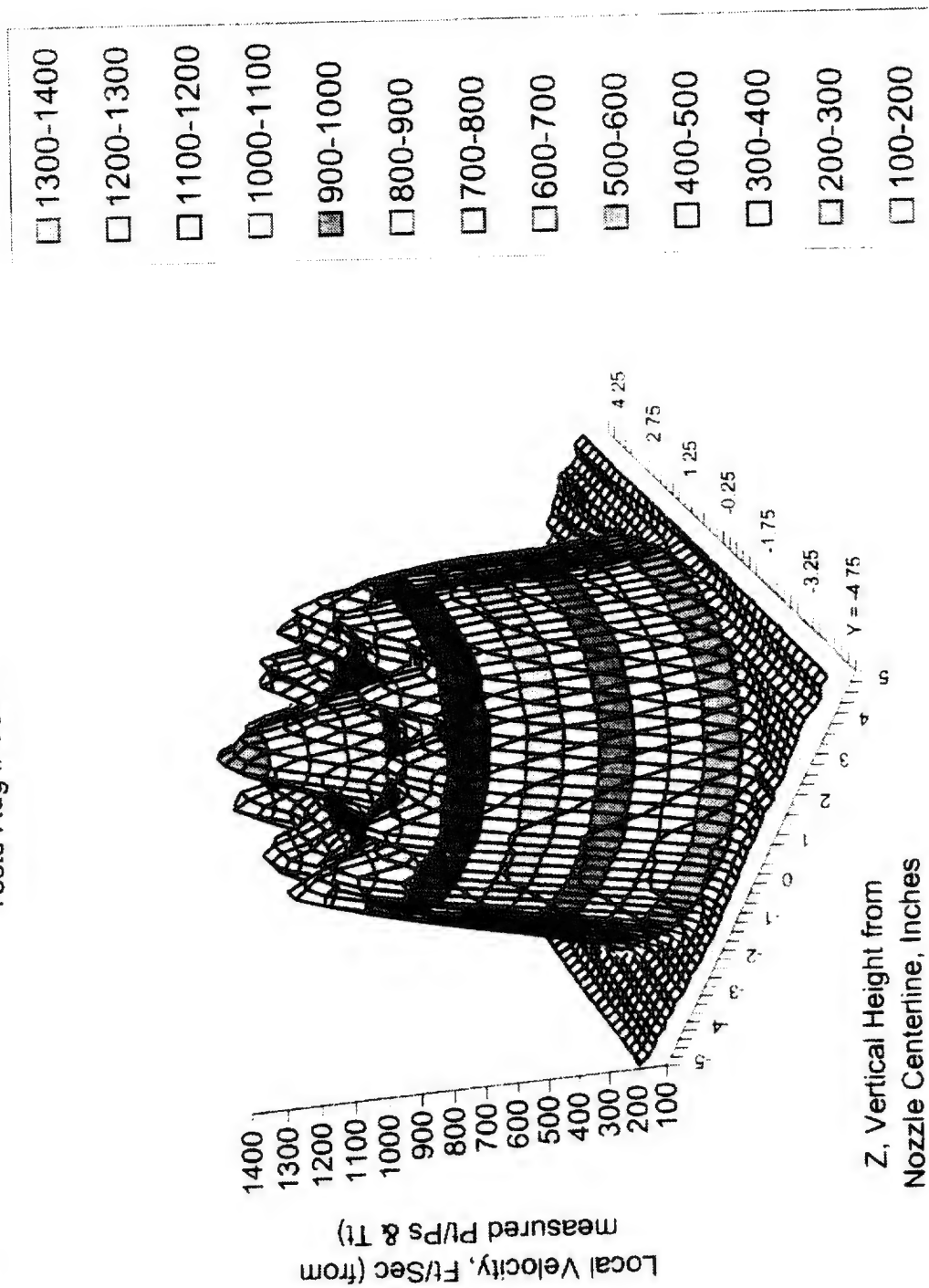




FIGURE 23 (b)

12L Baseline Mixer w/100% Nozzle Length, Velocity Survey at  $x/D=1.0$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core(Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V577

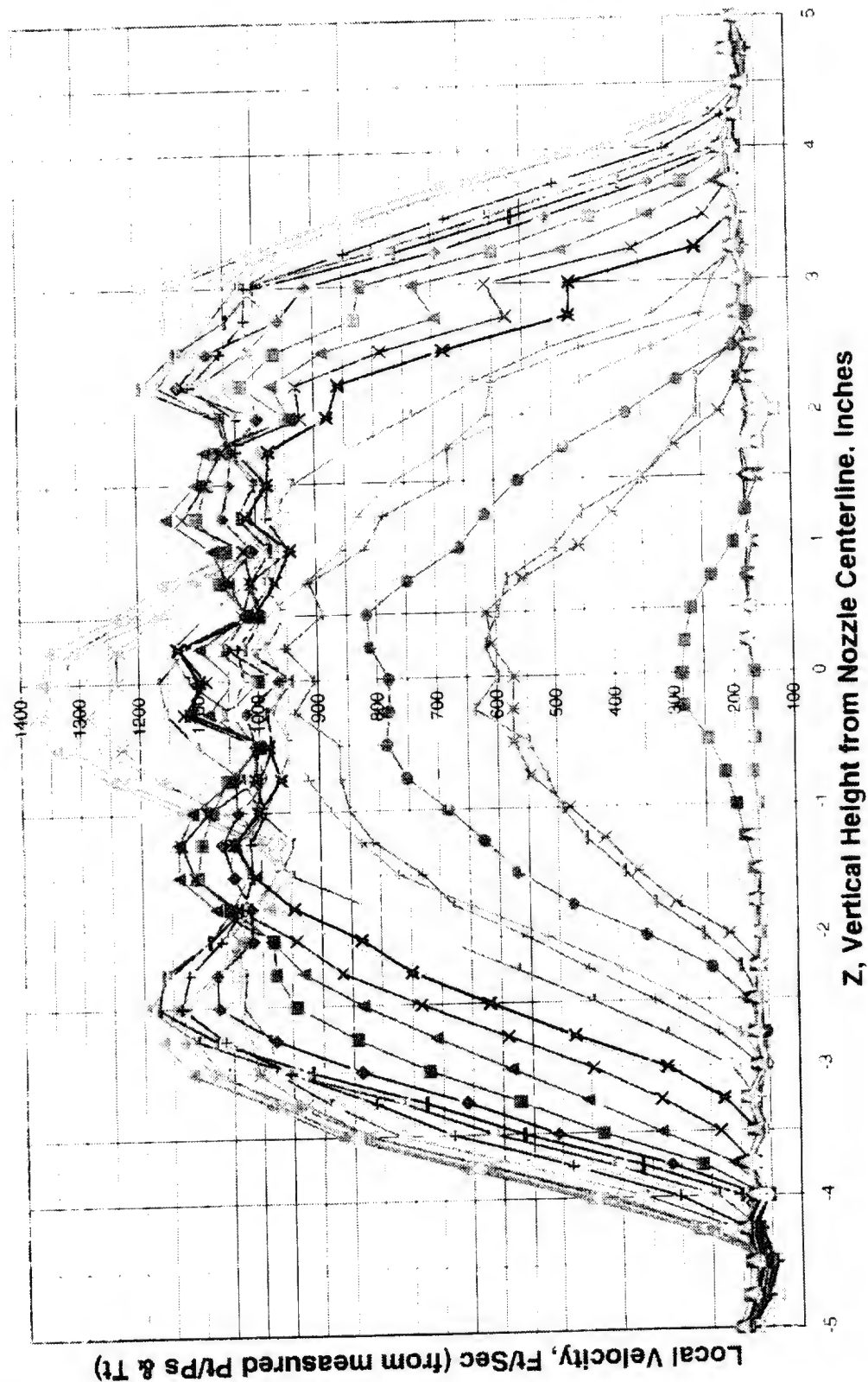




Figure 24(a). 12L Baseline Mixer with Cutouts (12CL), 100% Nozzle Length, Velocity Survey @  
x/D=1.0, 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic  
Mixer/Plume Tests Rdbg # V574

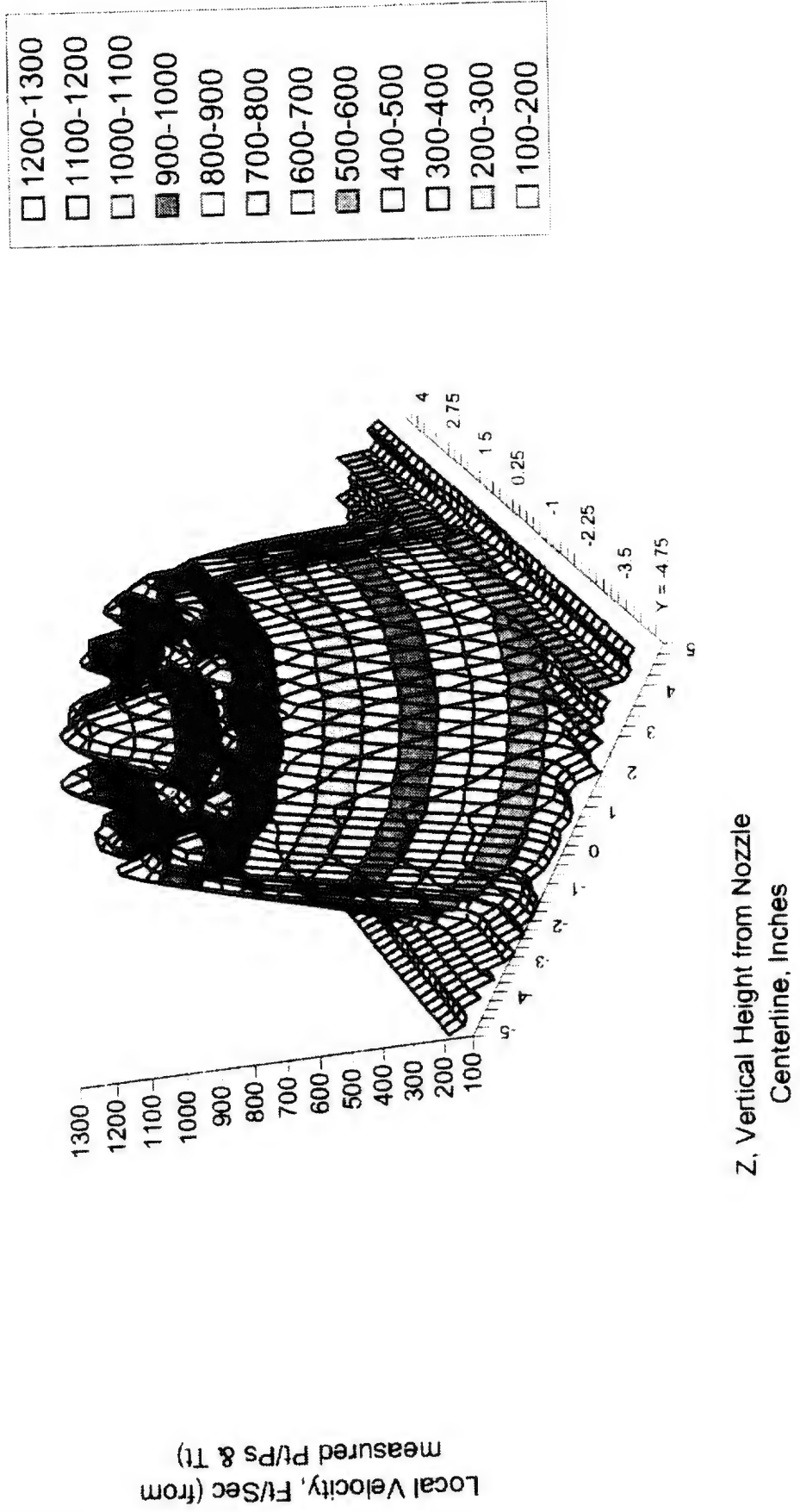




FIGURE 24 (b)

12L Baseline Mixer with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=1.0, 1.54$   
 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic  
 Mixer/Plume Tests Rdg # V574

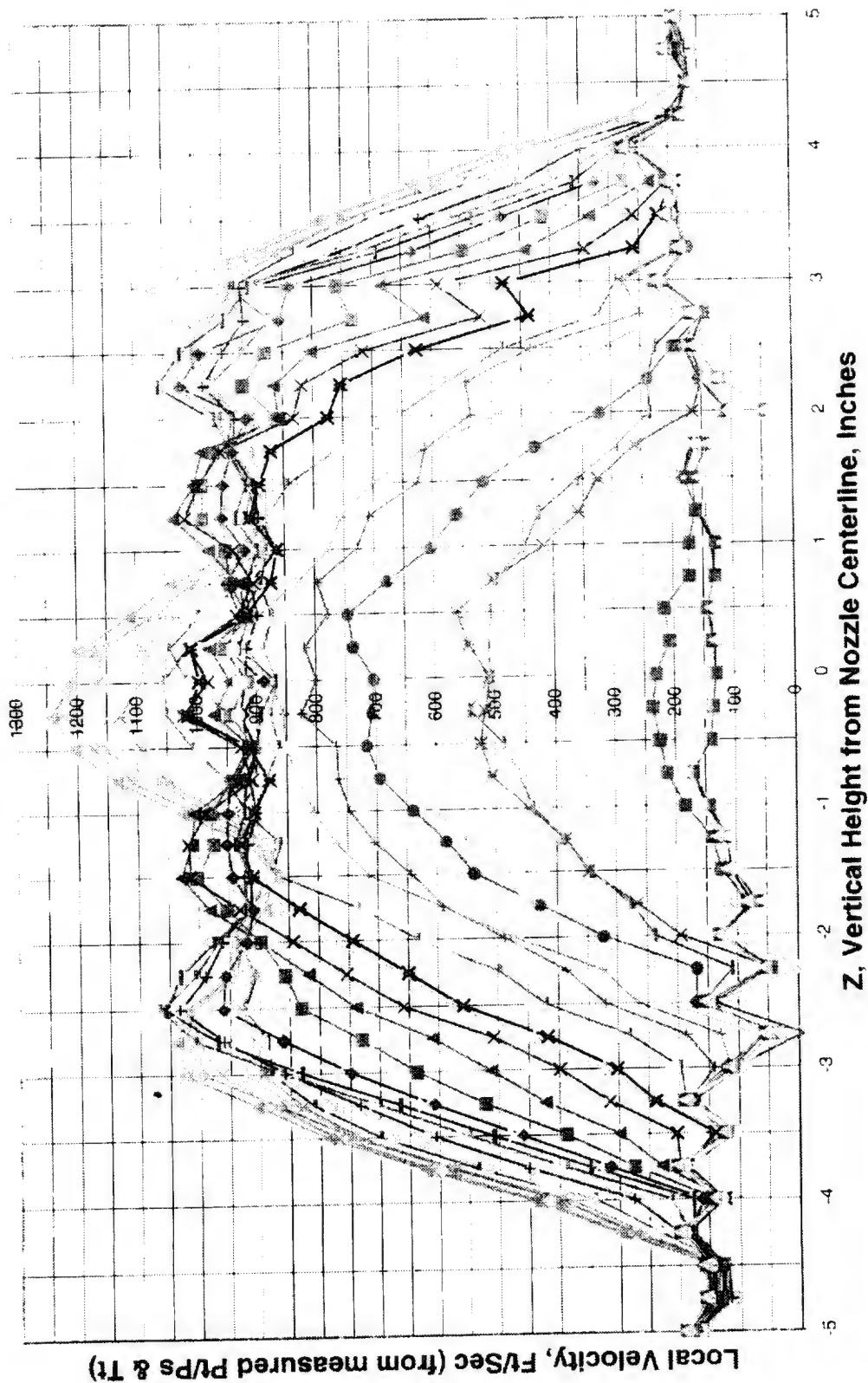




Figure 25(a). 20L Deep Mixer (20DH), 100% Nozzle Length, Velocity Survey at  $x/D=1.0, 1.54$   
 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic/Plume Tests  
 Rdg# V561

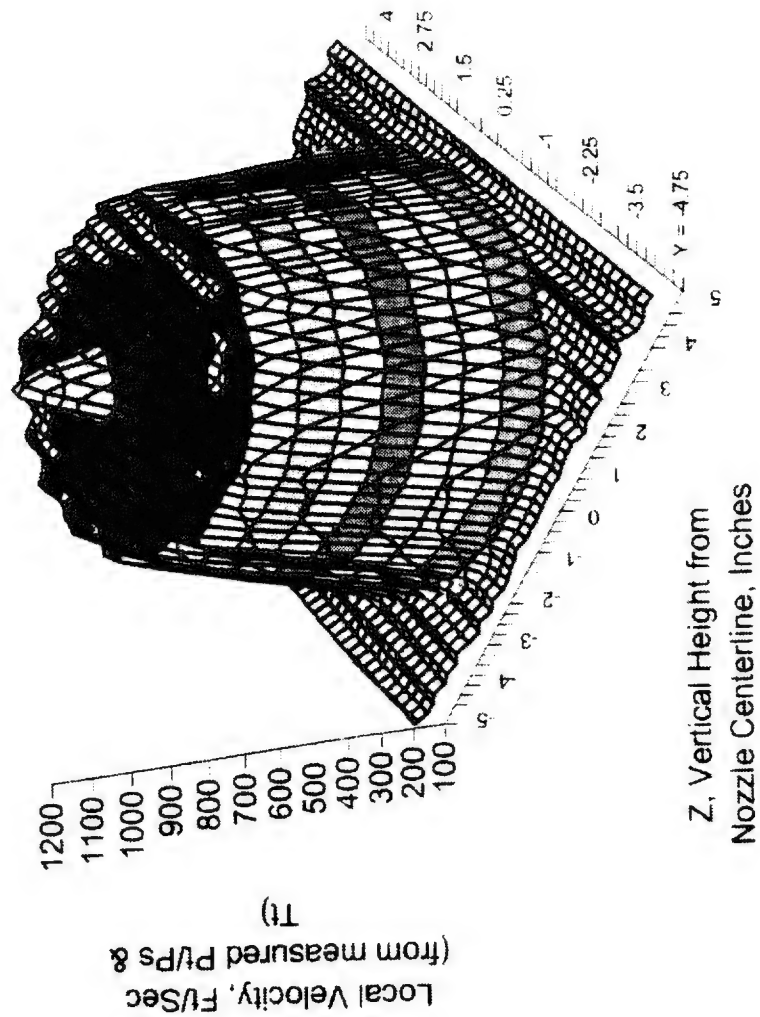




FIGURE 25 (b)

20L Deep Mixer, 100% Nozzle Length, Velocity Survey at  $x/D=1.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic/Plume Tests Rdg# V561

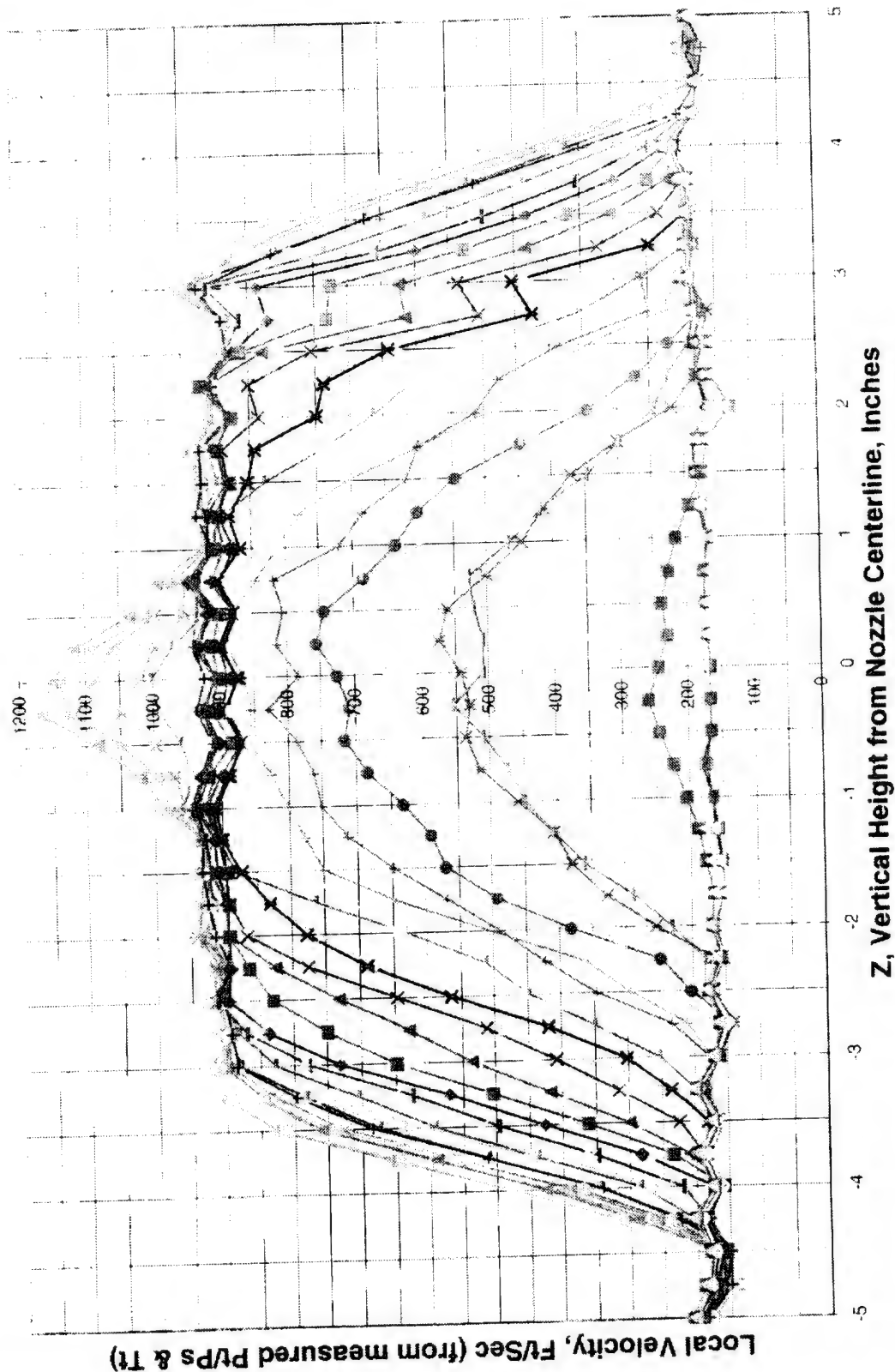




Figure 26(a). 20L Deep Mixer (20DH), 100% Nozzle Length, Velocity Survey at  $x/D=0.2$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V560

- ☐ 1100-1200
- ☐ 1000-1100
- ☒ 900-1000
- ☐ 800-900
- ☐ 700-800
- ☐ 600-700
- ☐ 500-600
- ☐ 400-500
- ☐ 300-400
- ☐ 200-300
- ☐ 100-200

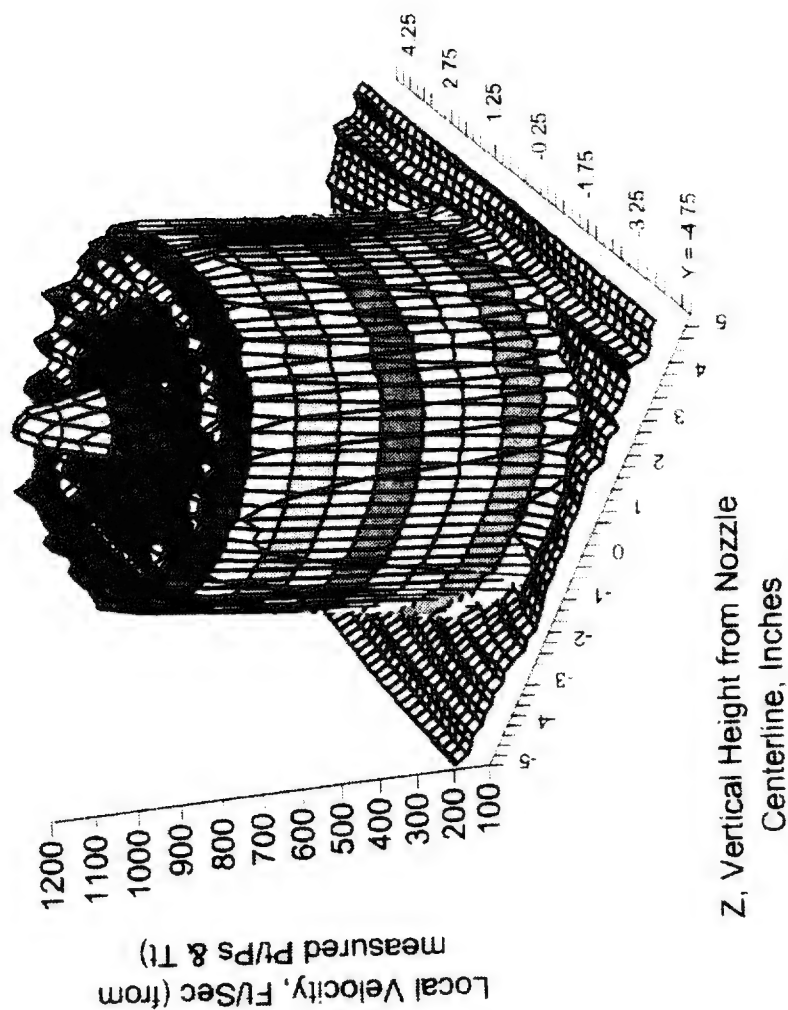




FIGURE 26 (b)

20L Deep Mixer, 100% Nozzle Length, Velocity Survey at  $x/D=0.2$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V560

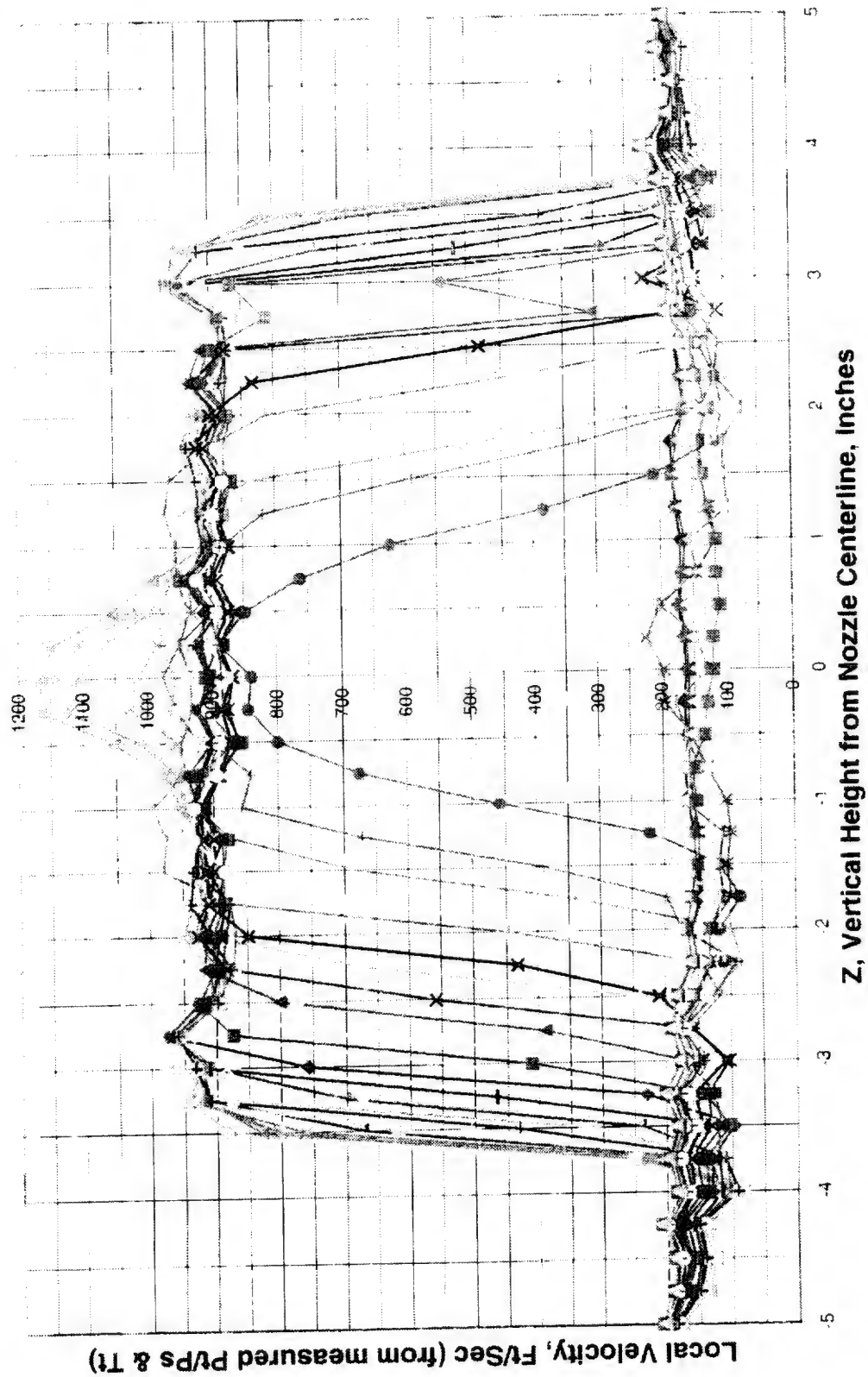




FIGURE 27

20L Deep Mixer, 100% Nozzle Length, Velocity Survey at  $x/D=0.5$ , 1.54 NPR)core, 1.61NPR)fan, 2.62 Tt)core(Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V559

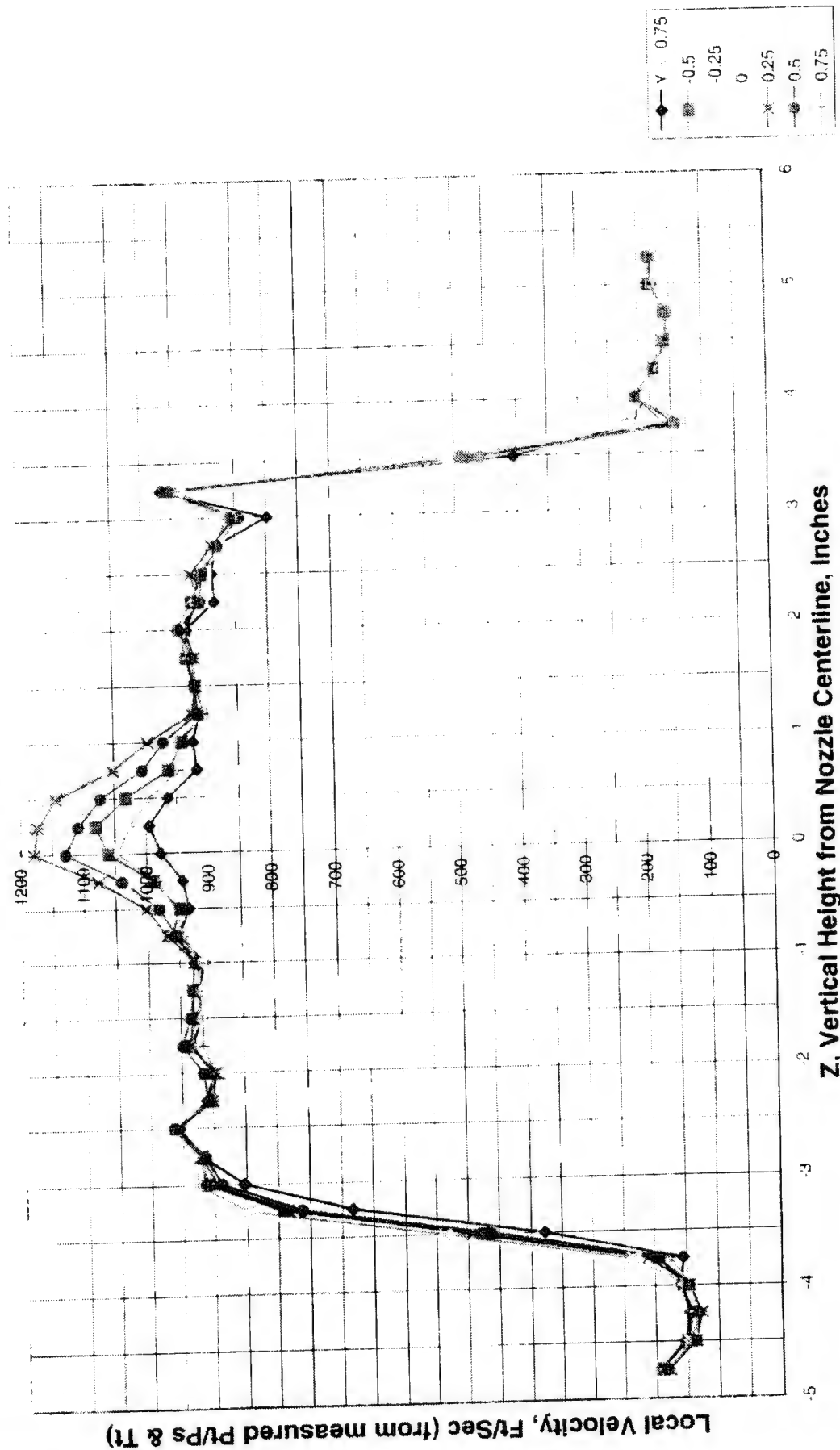




Figure 28(a). 20L Deep Mixer (20DH), 100% Nozzle Length, Velocity Survey at  $x/D=1.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS. 1996 NASA-LeRC Acoustic/Plume Tests  
Rdg# V561

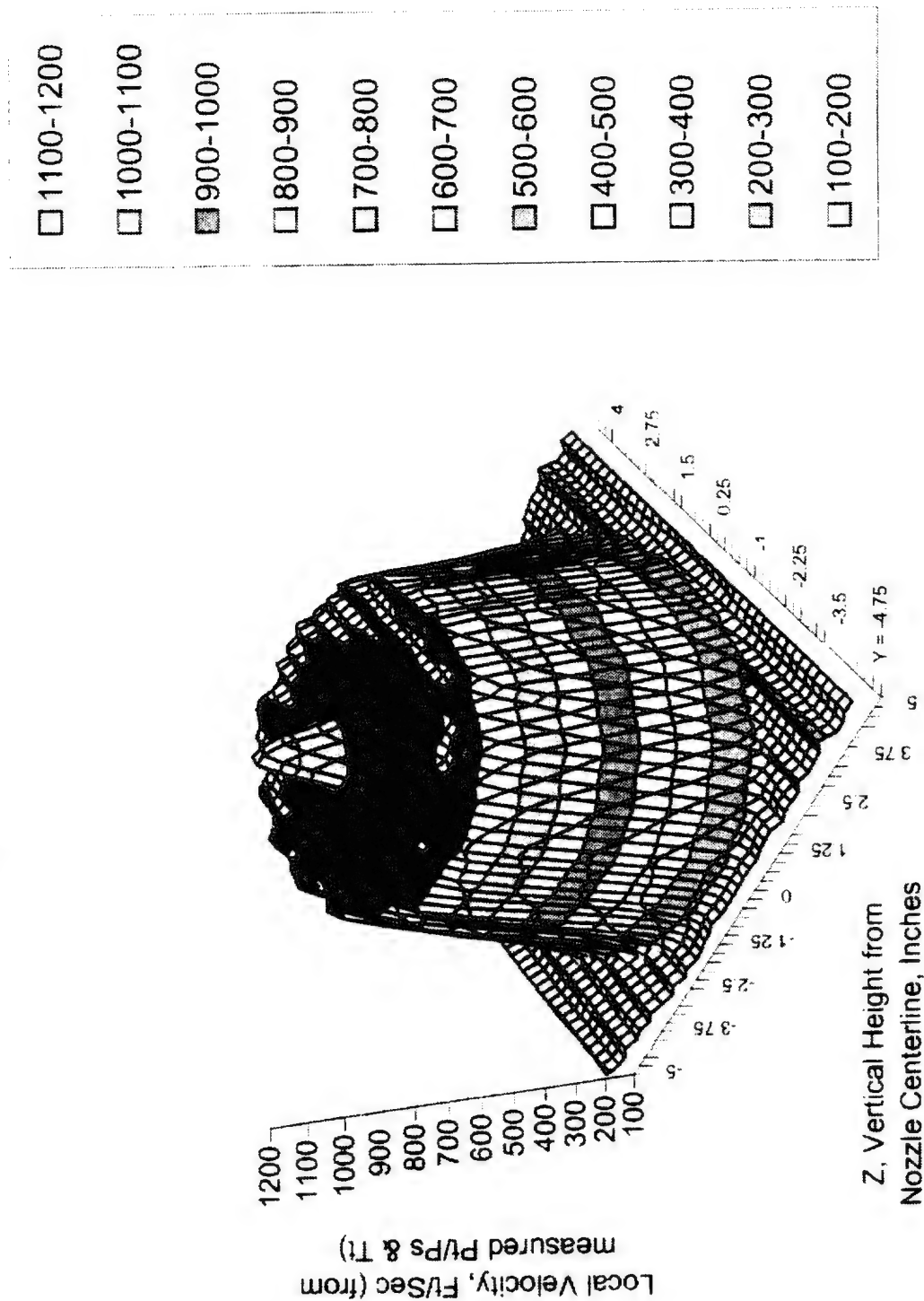




FIGURE 28 (b)

20L Deep Mixer, 100% Nozzle Length, Velocity Survey at  $x/D=1.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic/Plume Tests Rdg# V

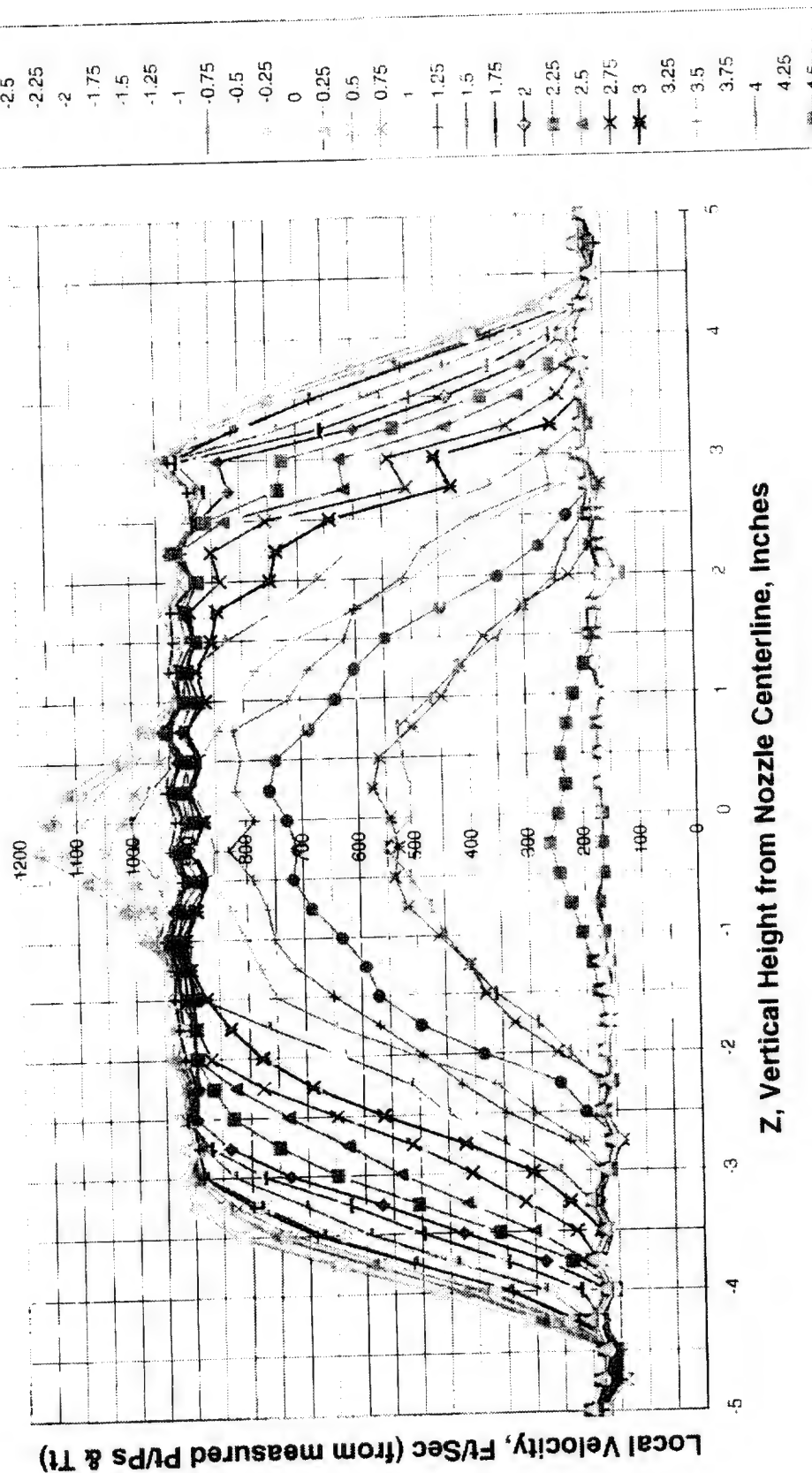




FIGURE 29

20L Deep Mixer, 100% Nozzle Length, Velocity Survey at  $x/D=3.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg# V558

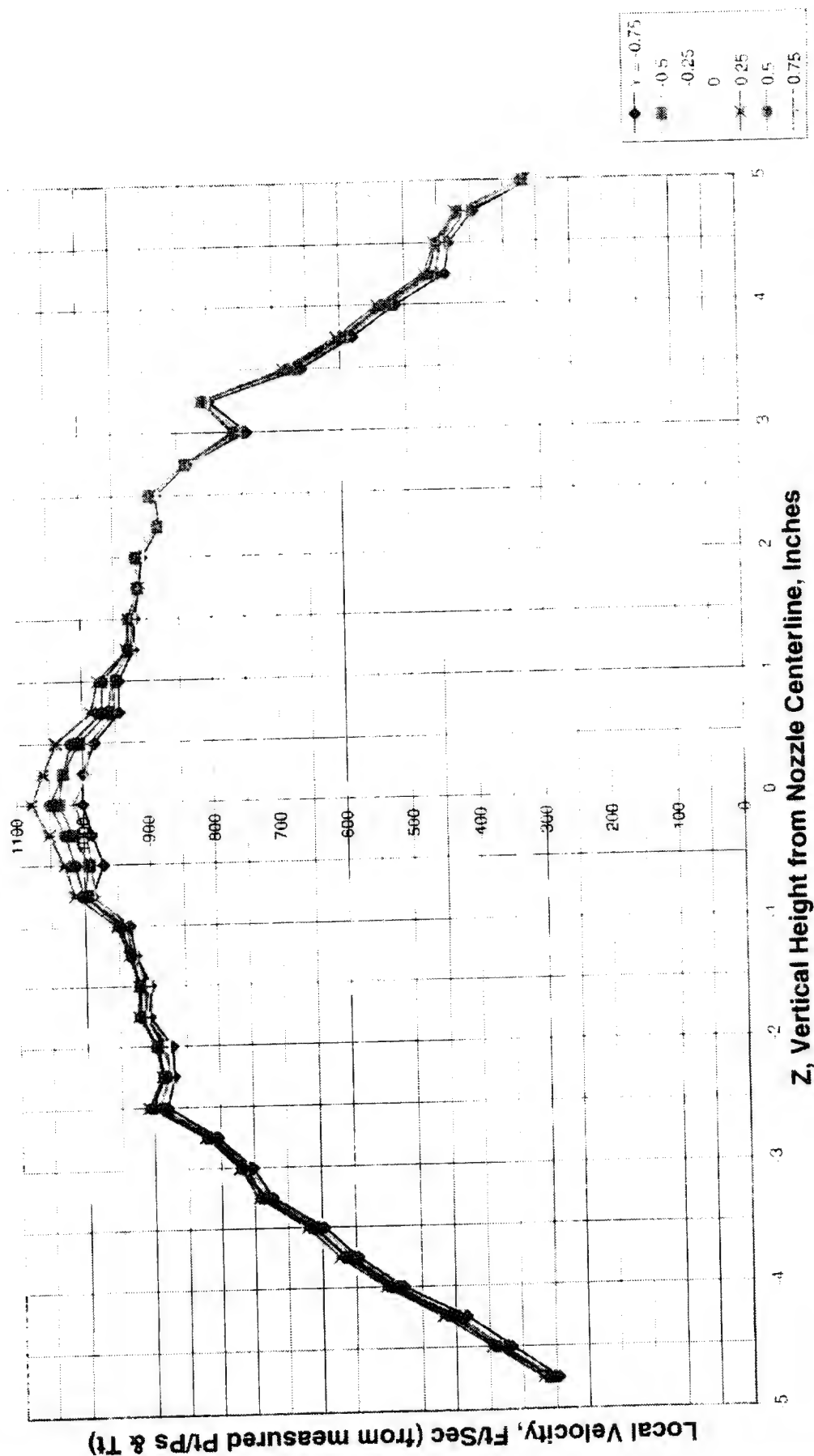




FIGURE 30

20L Deep Mixer, 100% Nozzle Length, Velocity Survey at  $x/D=5.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V549

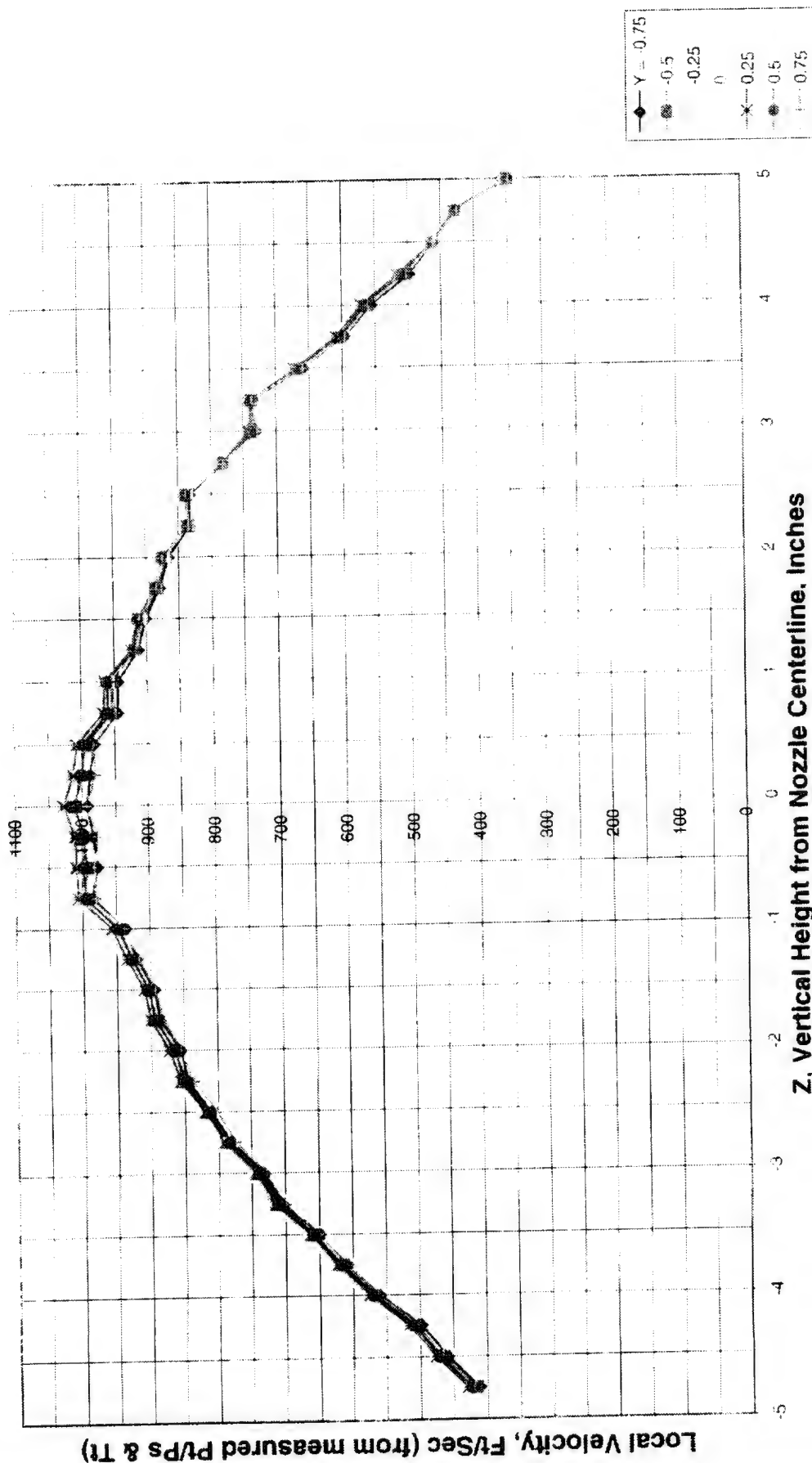




FIGURE 31

20L Deep Mixer, 100% Nozzle Length, Velocity Survey @  $x/D=7.5$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V548

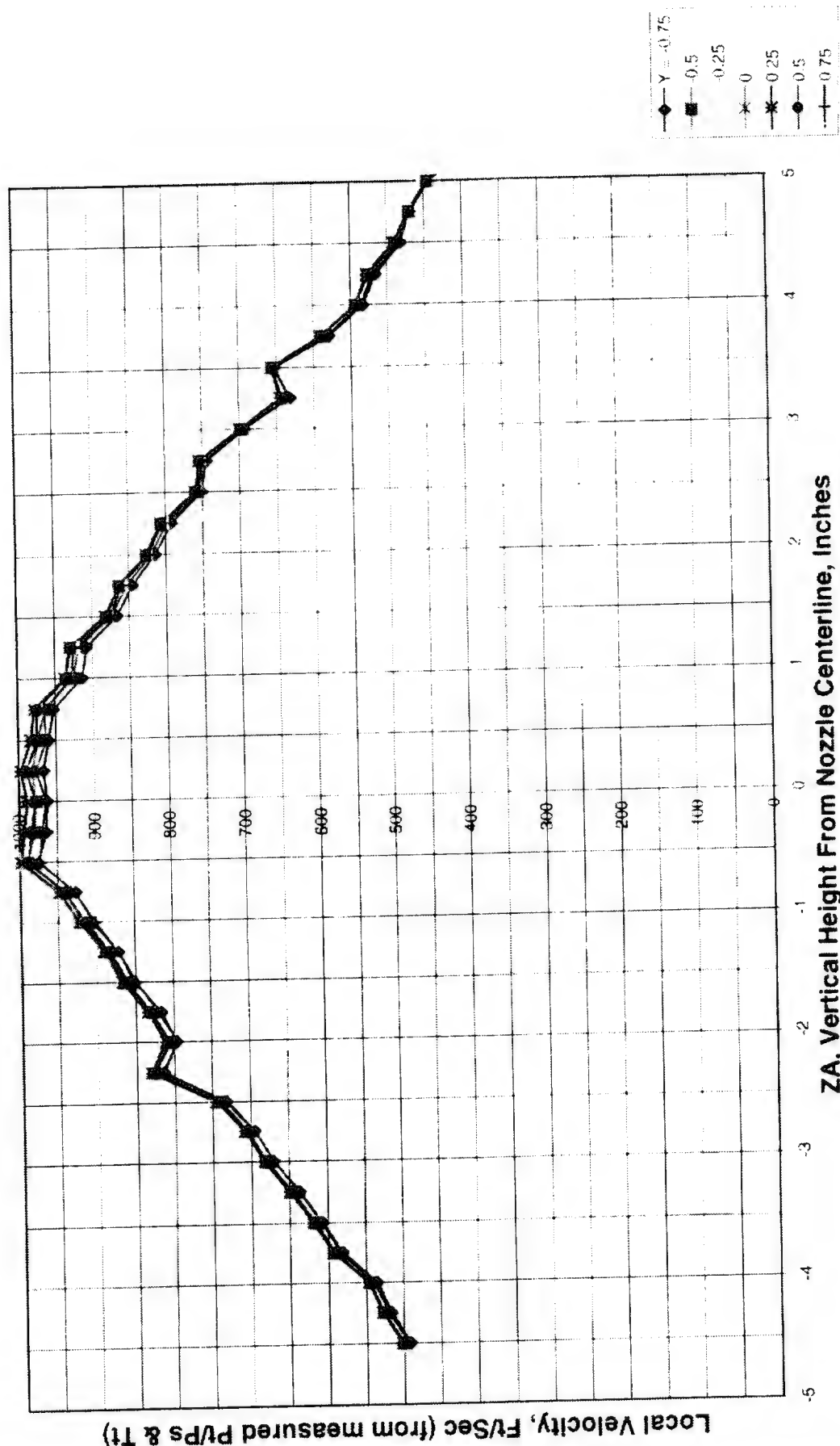




FIGURE 32

20L Deep Mixer, 100% Nozzle Length, Velocity Survey @  $x/D=10.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V547

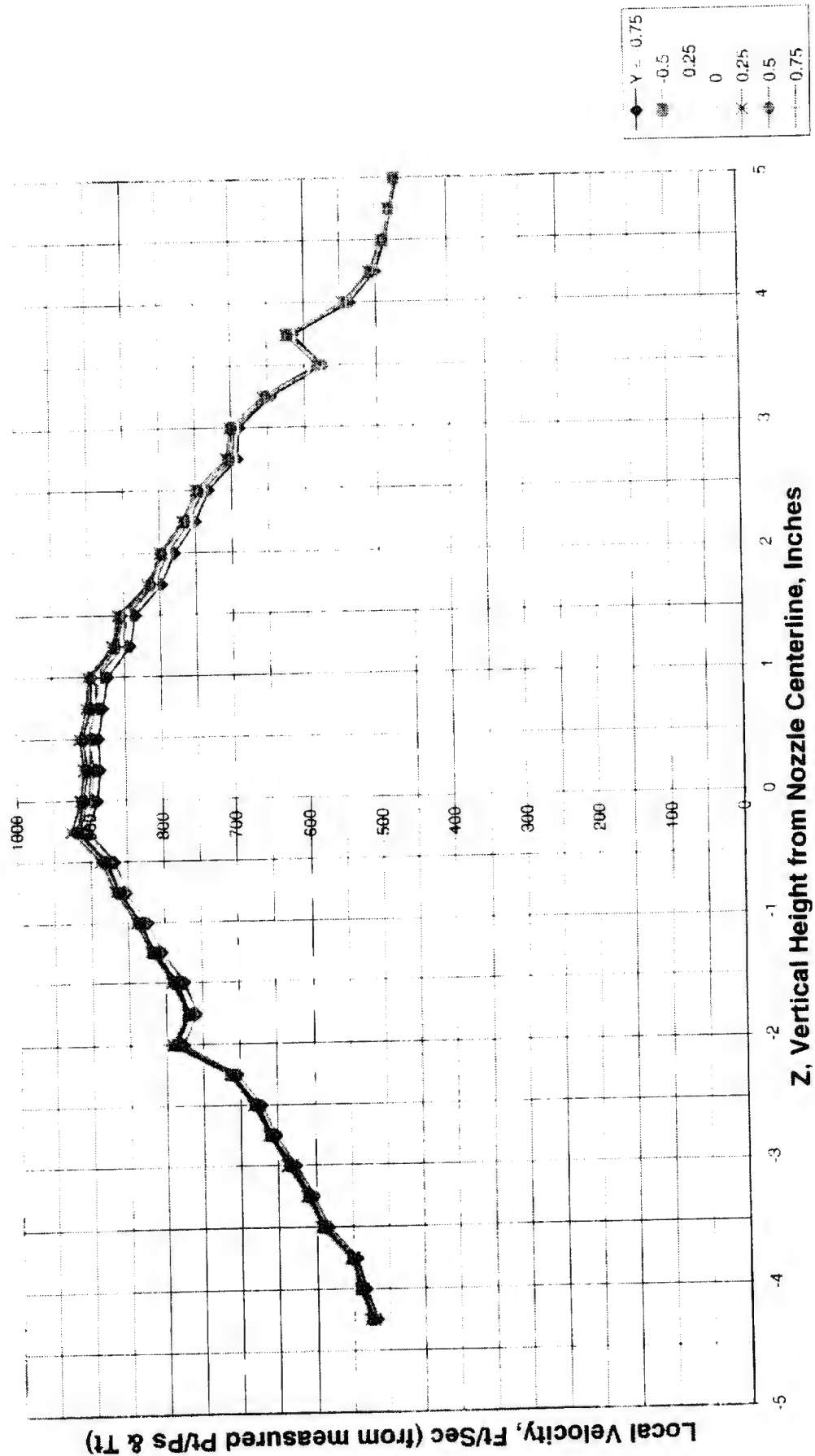




Figure 33(a). 12L Baseline with Cutouts (12CL), 100% Nozzle Length, Velocity Survey @  $x/D=0.2$ ,  
 1.54 NPR)core, 1.61 NPR)fan, 2.62 Ti)core/Ti)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic  
 Mixer/Plume Tests Rdg # V575

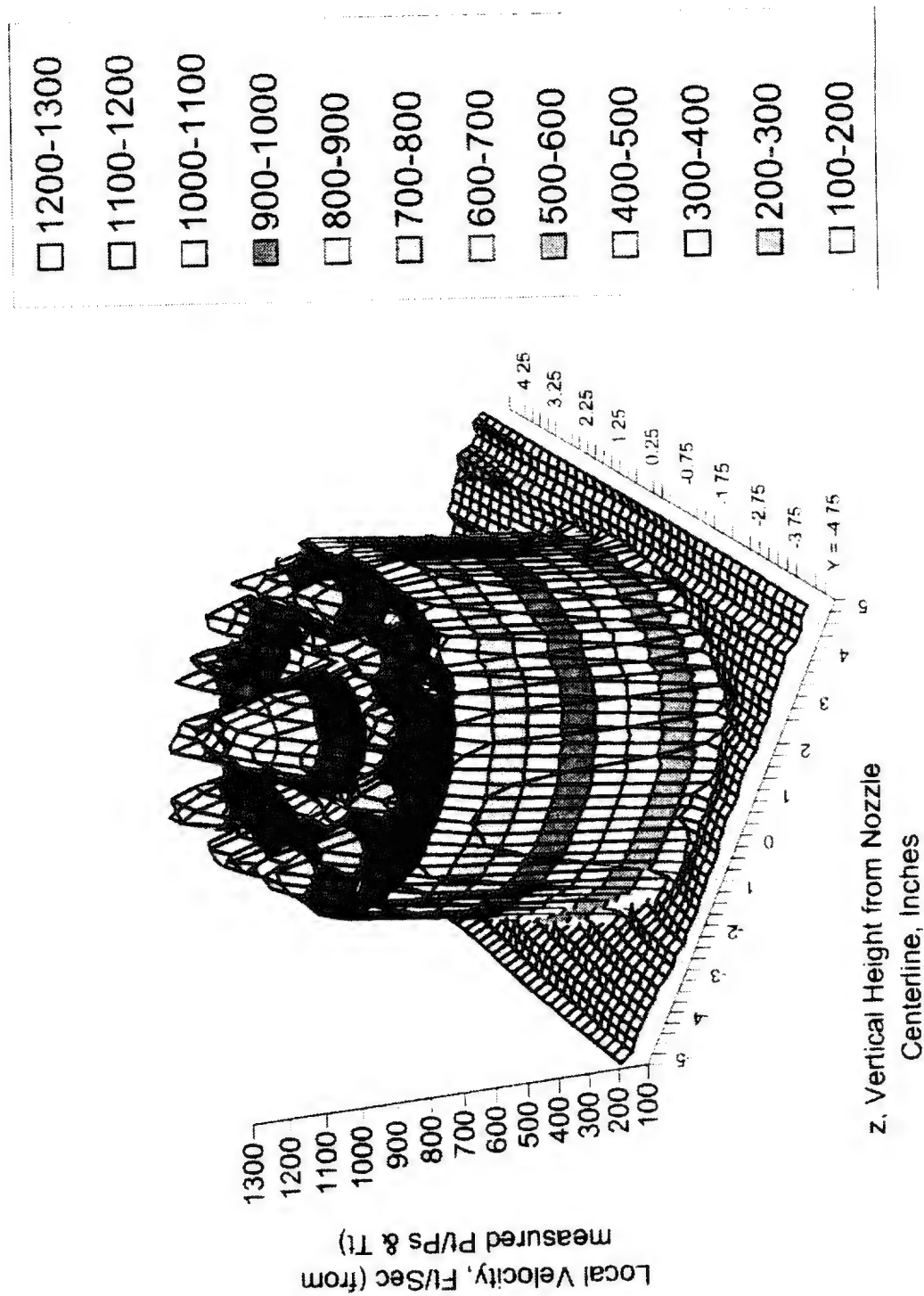




FIGURE 33 (b)

12L Baseline with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=0.2$ , 1.54 NPR)core,  
 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests  
 Rdg # V575

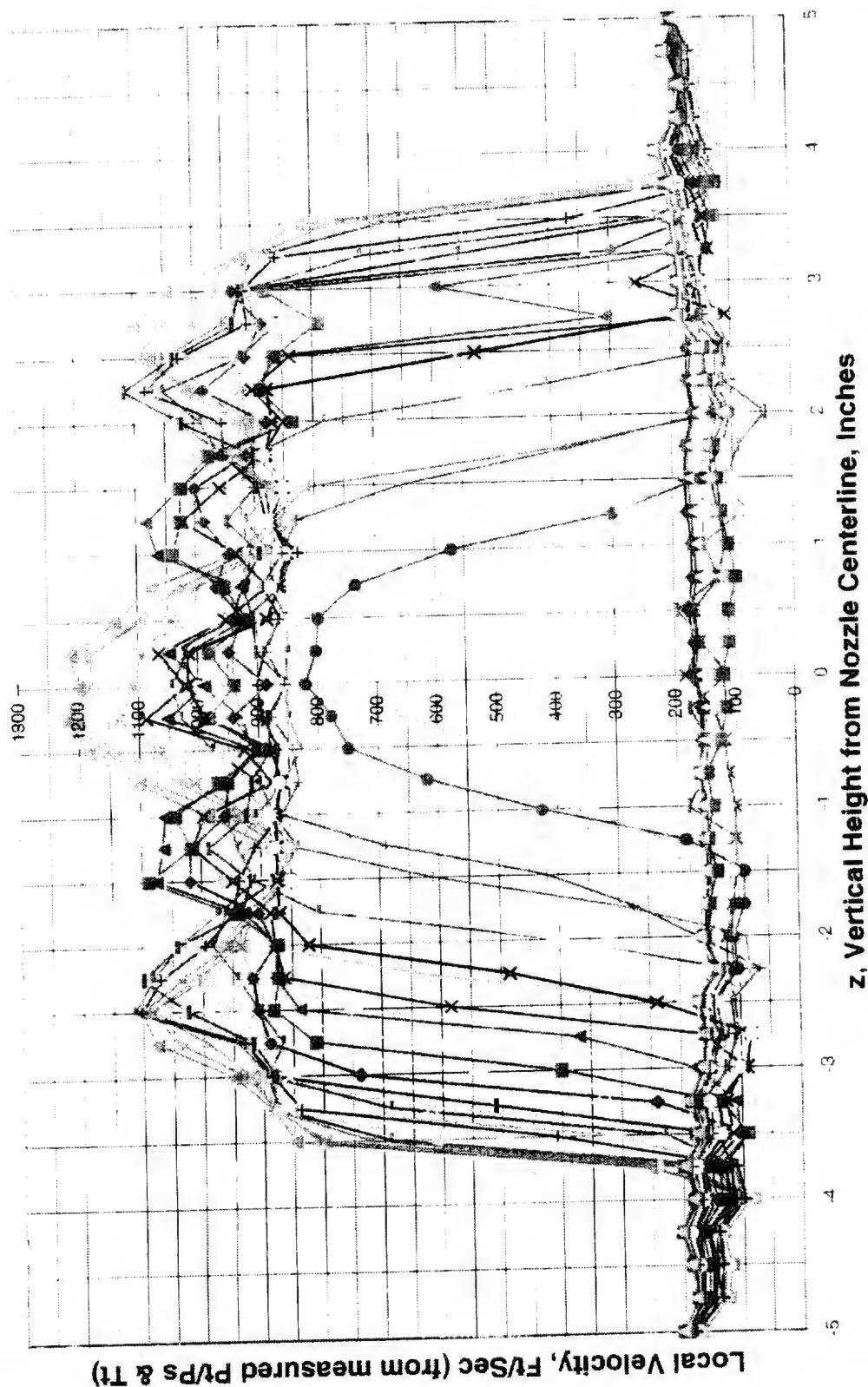




FIGURE 34

12L Baseline Mixer with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=0.5, 1.54$   
 NPR)core, 1.61 NPR)fan, 2.62 Tt)core(Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic  
 Mixer/Plume Tests Rdg # V573

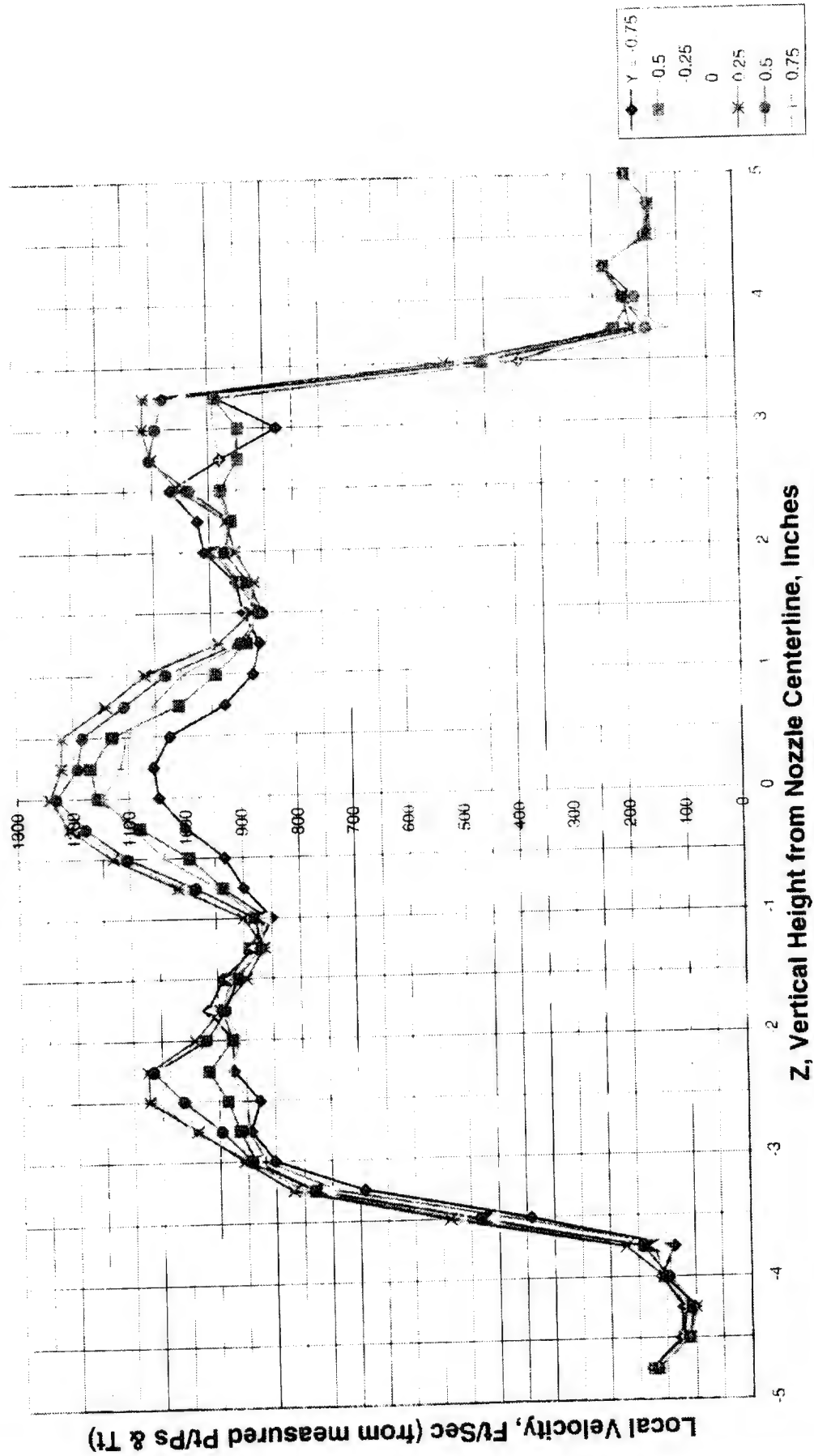




Figure 35(a). 12L Baseline Mixer with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=1.0$ ,  
 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic  
 Mixer/Plume Tests Rtdg # V574

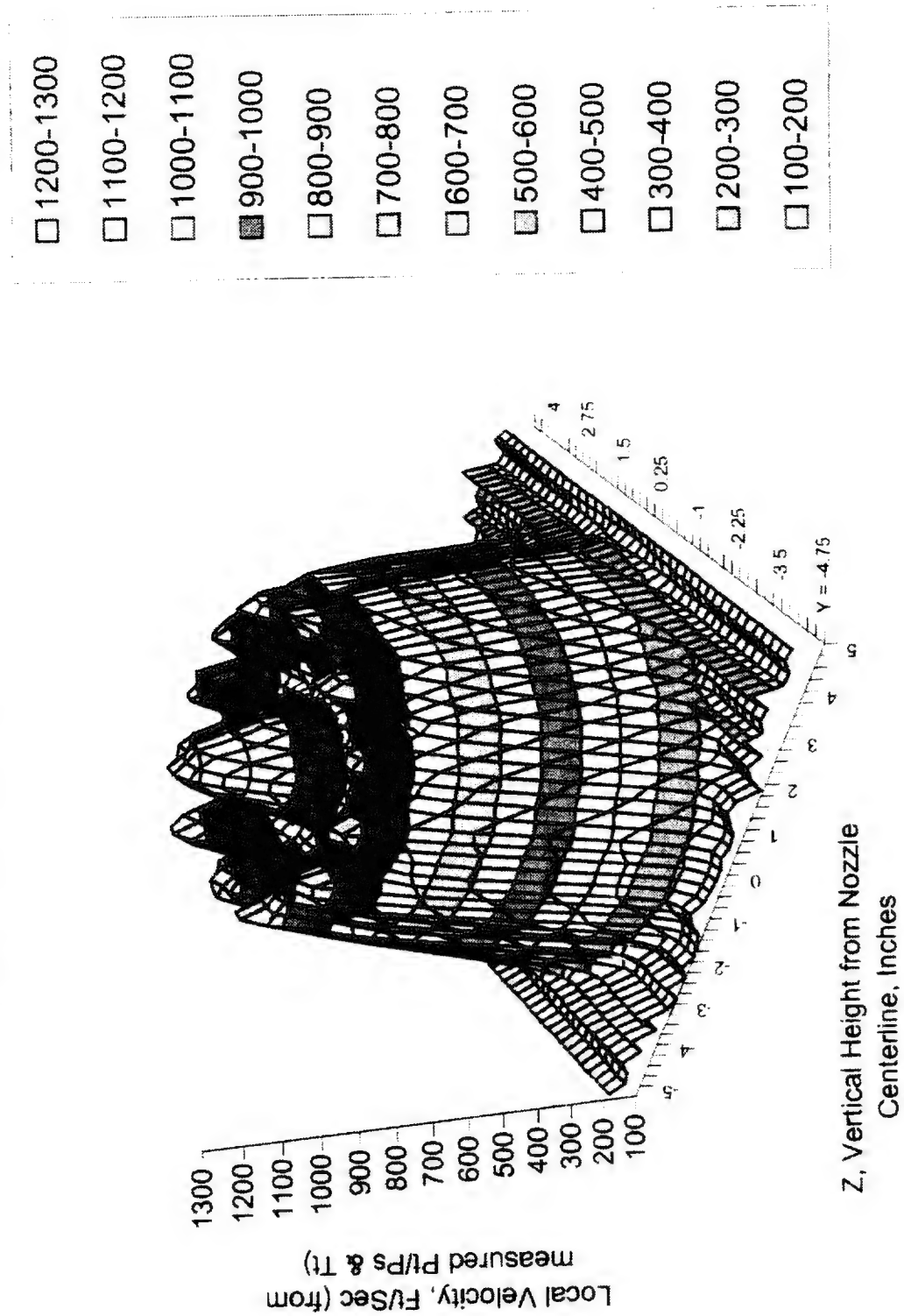




FIGURE 35 (b)

12L Baseline Mixer with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=1.0, 1.54$   
 NPR)core, 1.61 NPR)fan, 2.62 Tt)core(Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic  
 Mixer/Plume Tests Rdg # V574

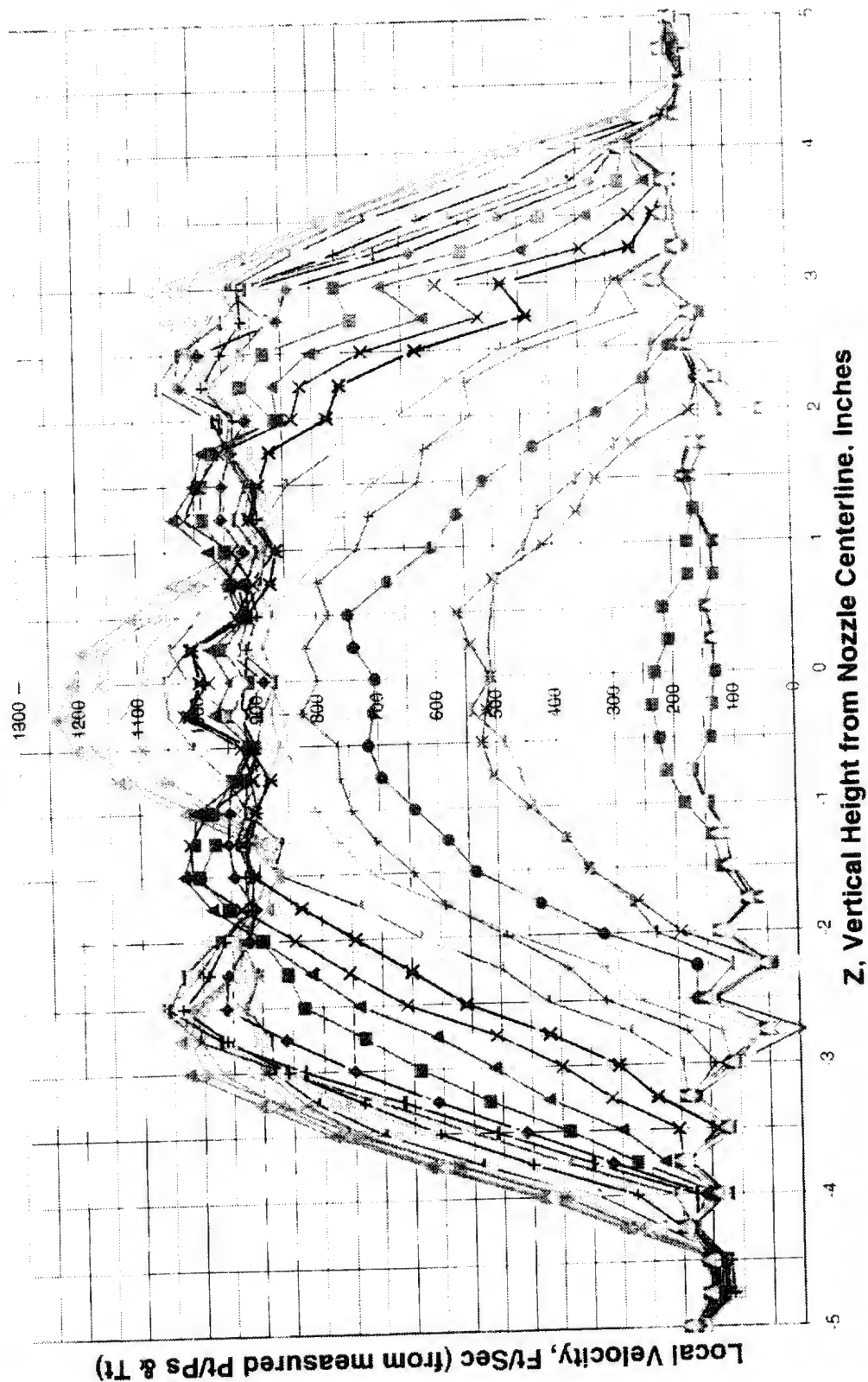




FIGURE 36

12L Baseline with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=3.0$ , 1.54 NPR)core,  
1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests  
Rdg # V572

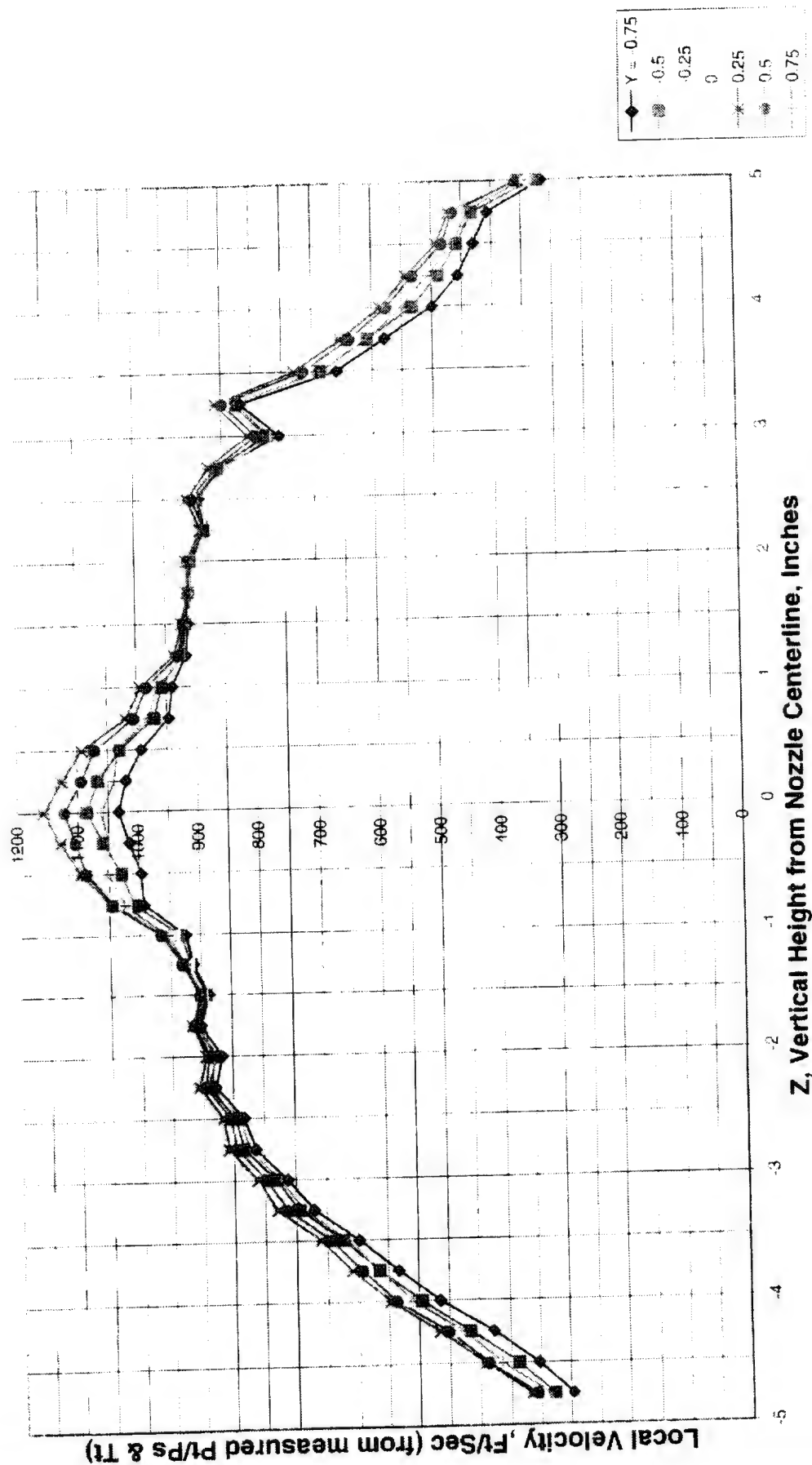




FIGURE 37

12L Baseline Mixer with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=5.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V571

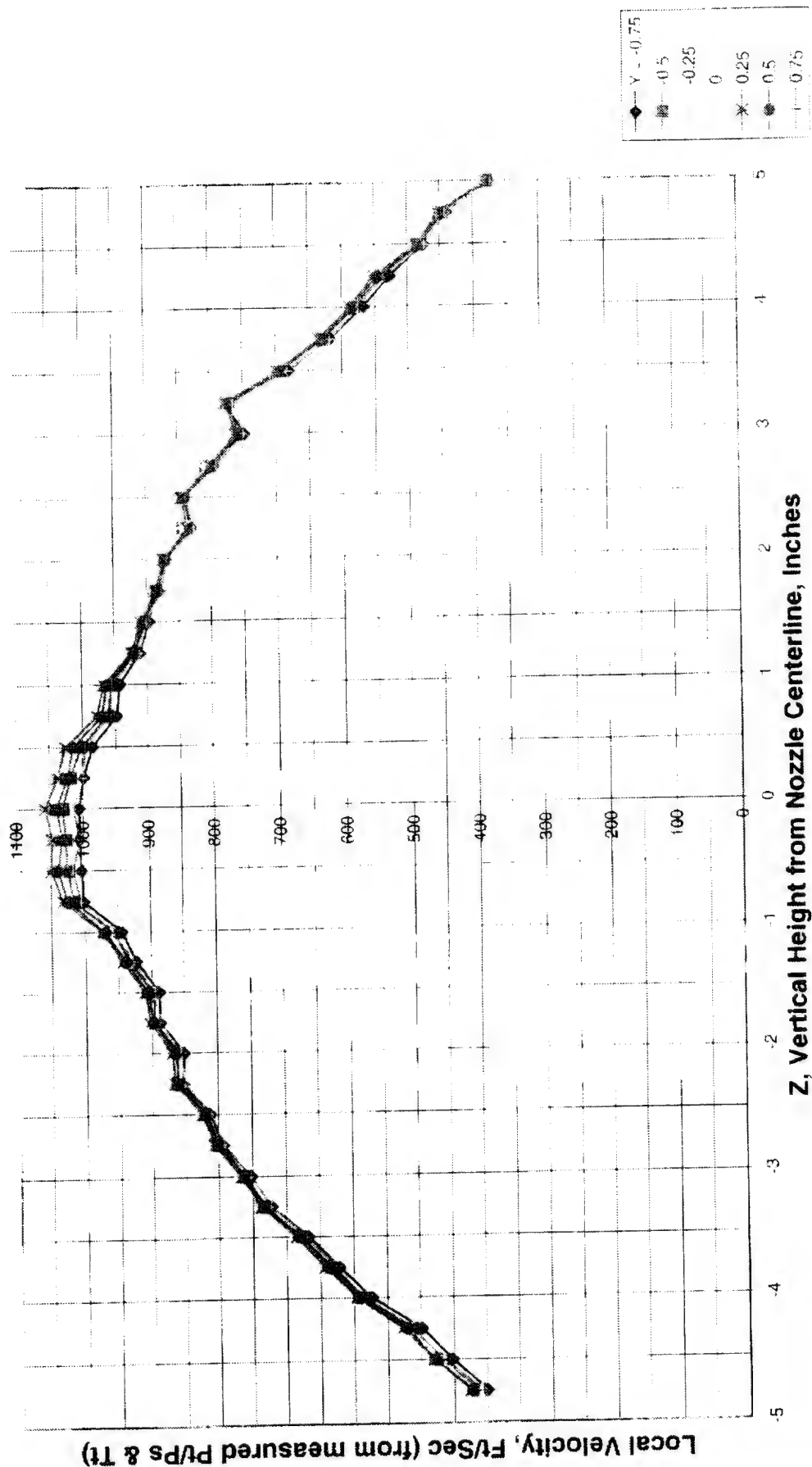




FIGURE 38

12L Baseline Mixer with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=7.5, 1.54$   
 NPR)core, 1.61 NPR(fan, 2.62 Tt)core(Tt(fan, 0.2 Mn)FS: 1996 NASA-LeRC Acoustic  
 Mixer/Plume Tests Rdg # V570

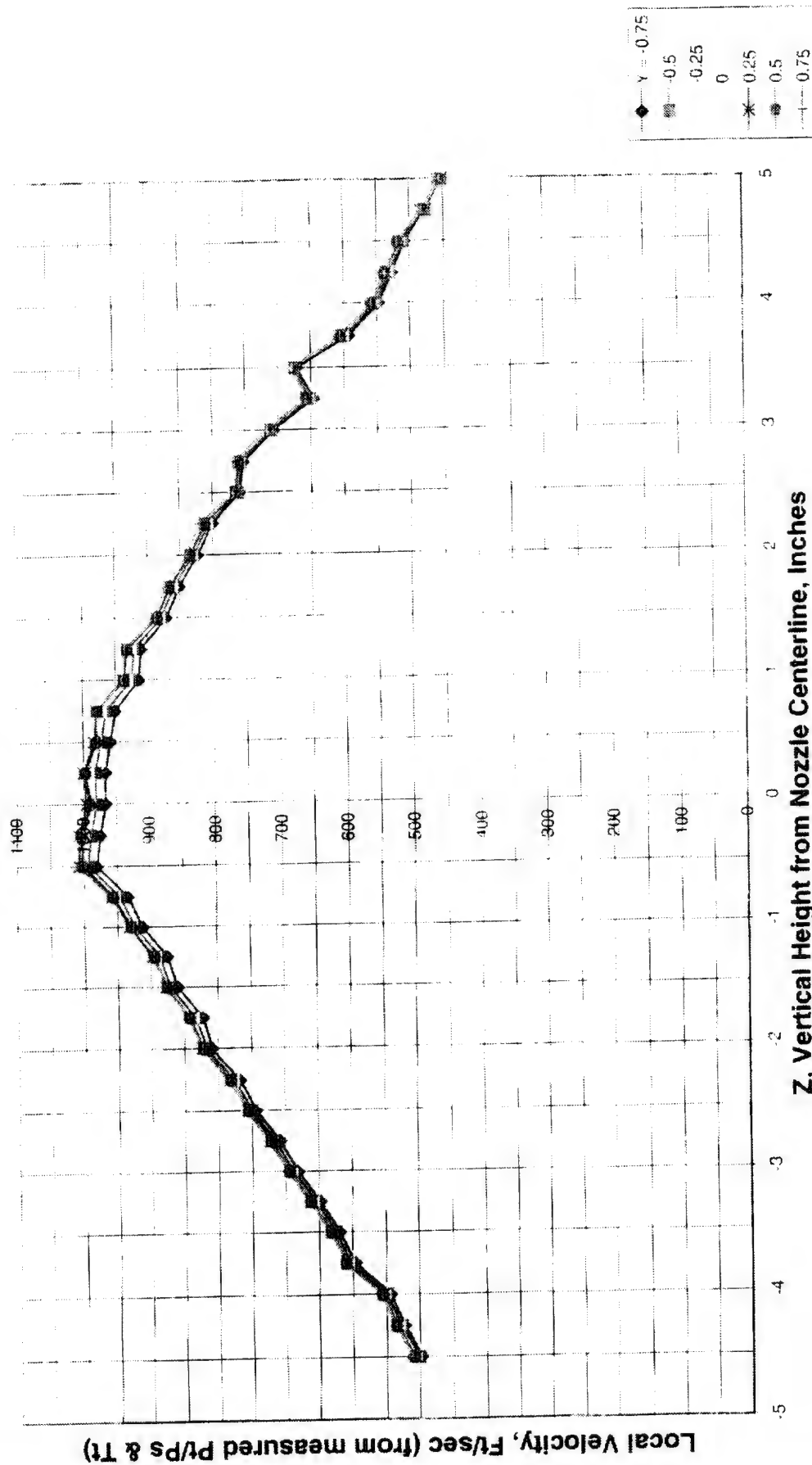




FIGURE 39

12L Baseline Mixer with Cutouts, 100% Nozzle Length, Velocity Survey @  $x/D=10.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt(fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V569

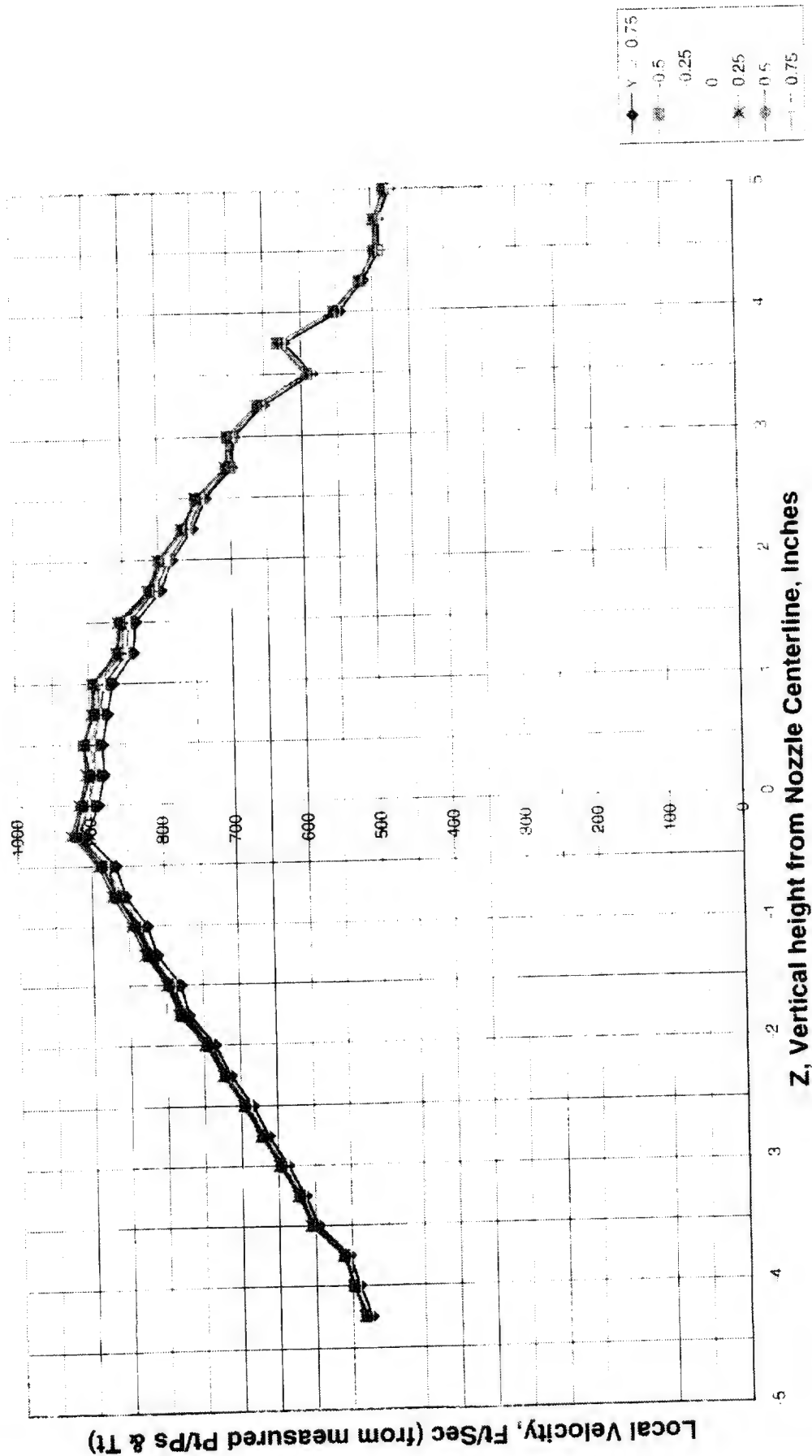




Figure 40(a). Velocity profiles for 12CL mixer with 100% nozzle length at  $X/D=0.2$  for TO #3 at  $M(fj) = 0.2$ .

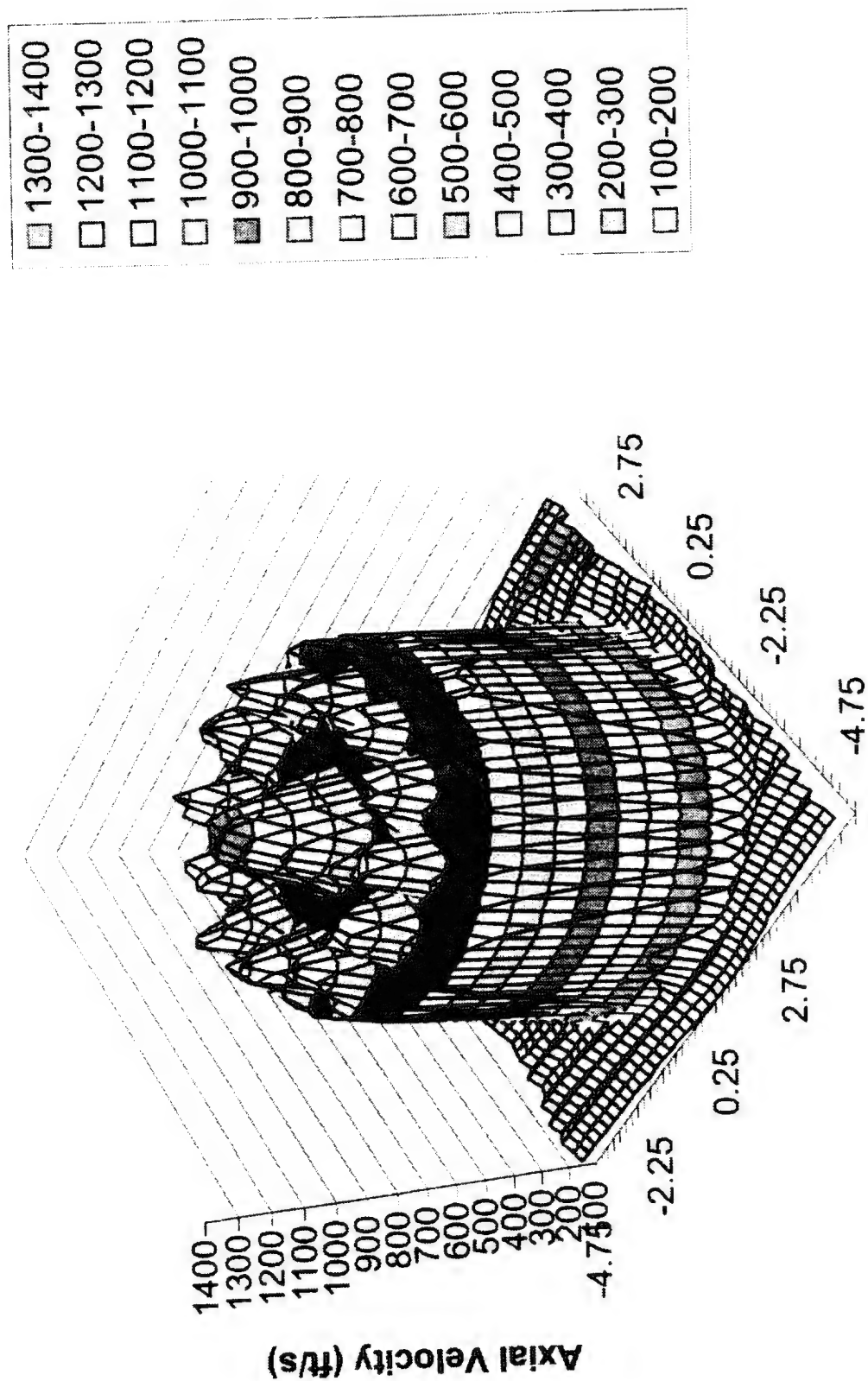




FIGURE 40(b)

12L Baseline Mixer w/100% Nozzle Length, Velocity Survey at  $x/D=0.2$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V576

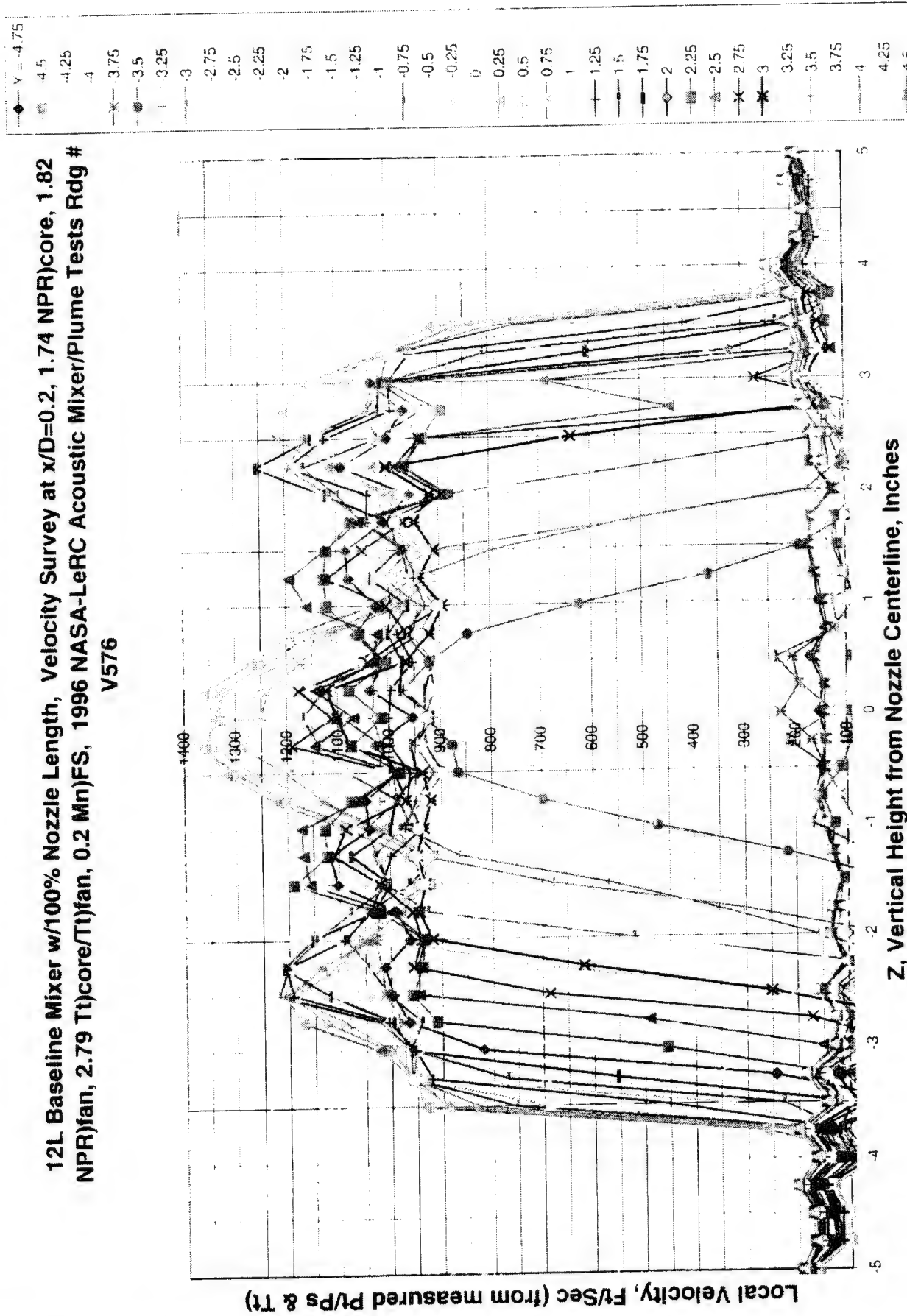




FIGURE 41

12L baseline Mixer w/100% Nozzle Length, Velocity Curve at  $x/D=0.5$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core(Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V578

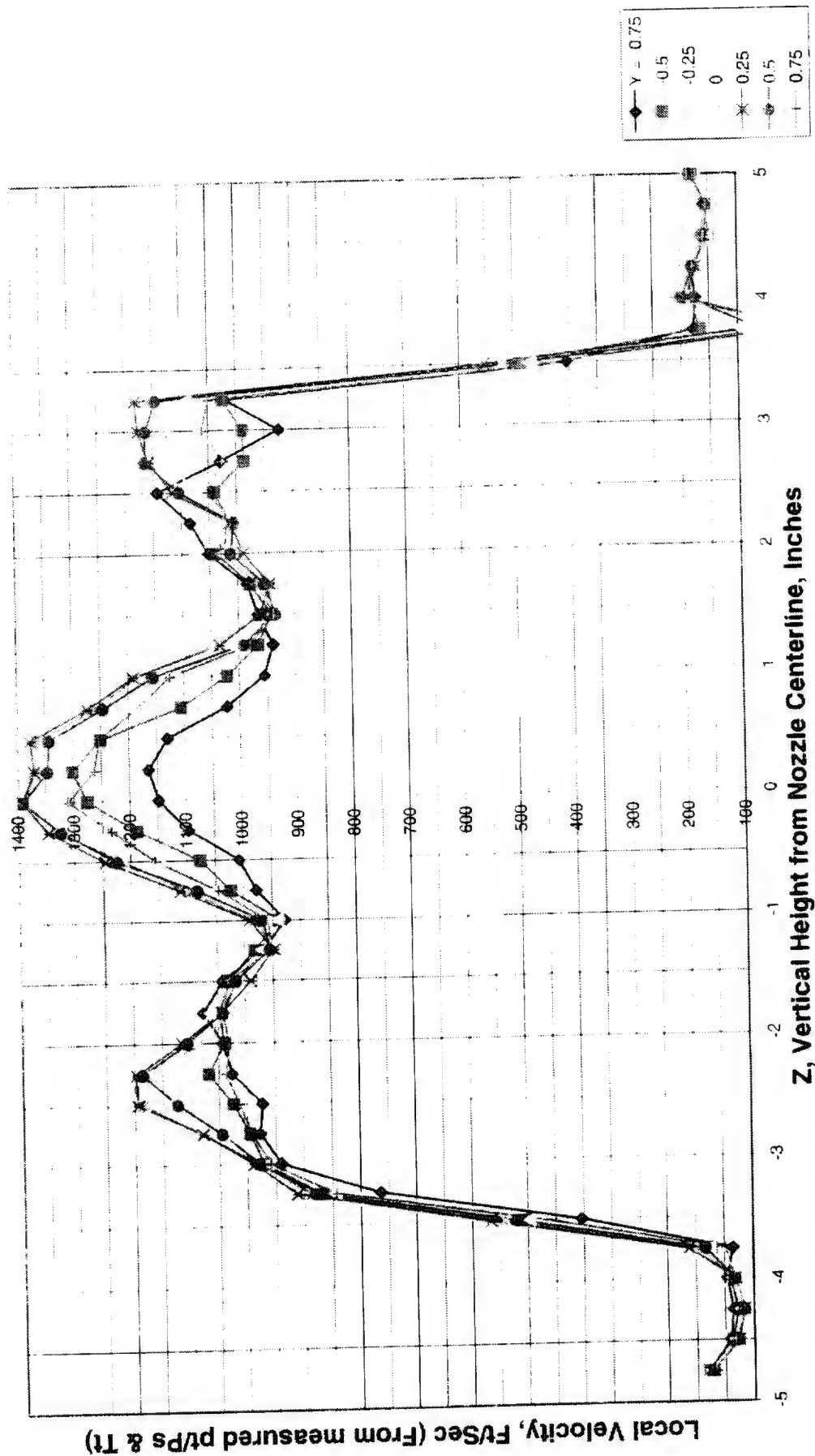




Figure 42(a). 12L Baseline Mixer (12CL) w/100% Nozzle Length, Velocity Survey at  $x/D=1.0, 1.74$   
 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume  
 Tests Rdg # V577

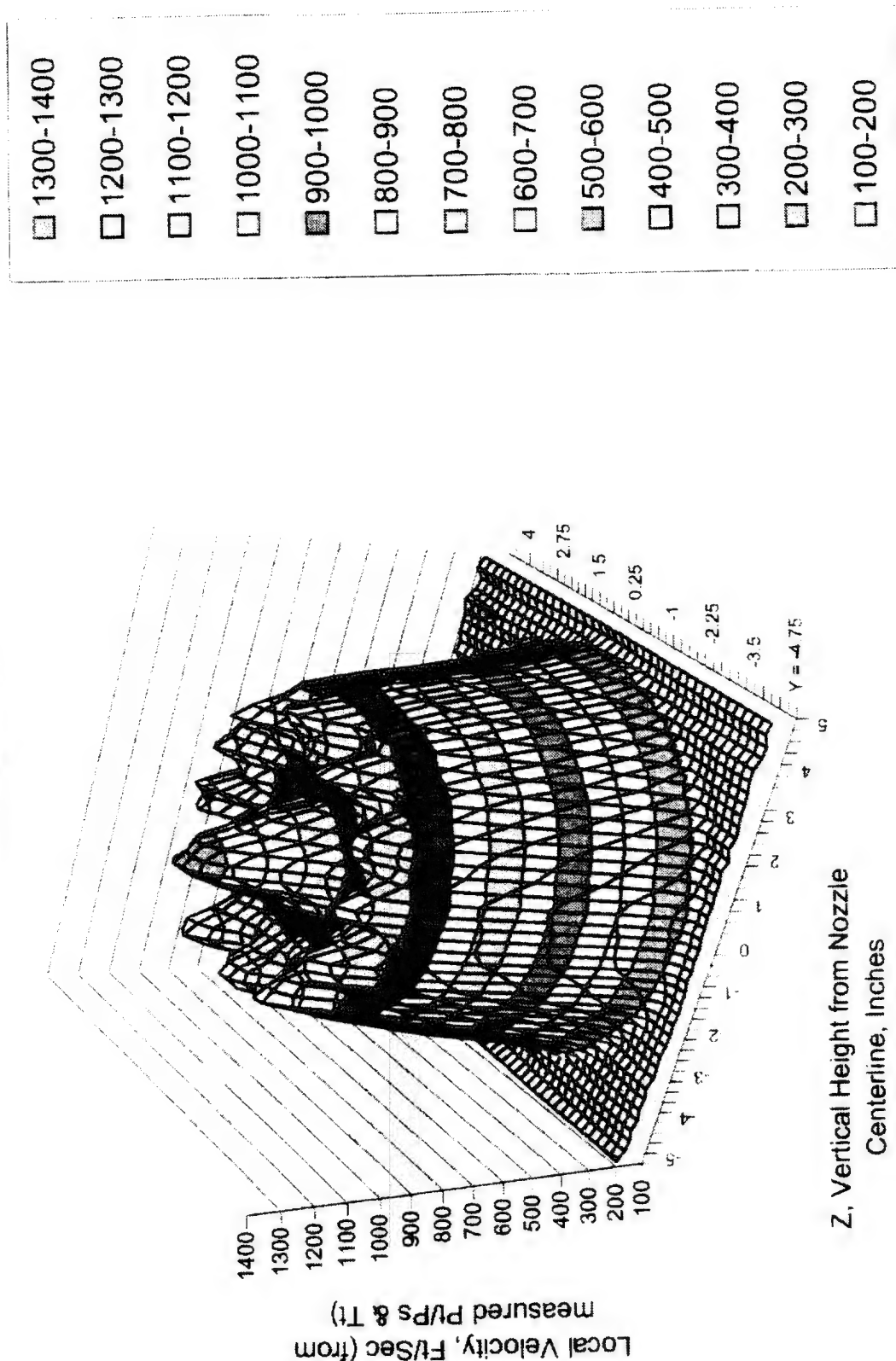




Figure 42(b). Zoom for 12L Baseline Mixer (12CL) w/100% Nozzle Length, Velocity Survey at  
 $x/D=1.0$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic  
 Mixer/Plume Tests Rdg # V577

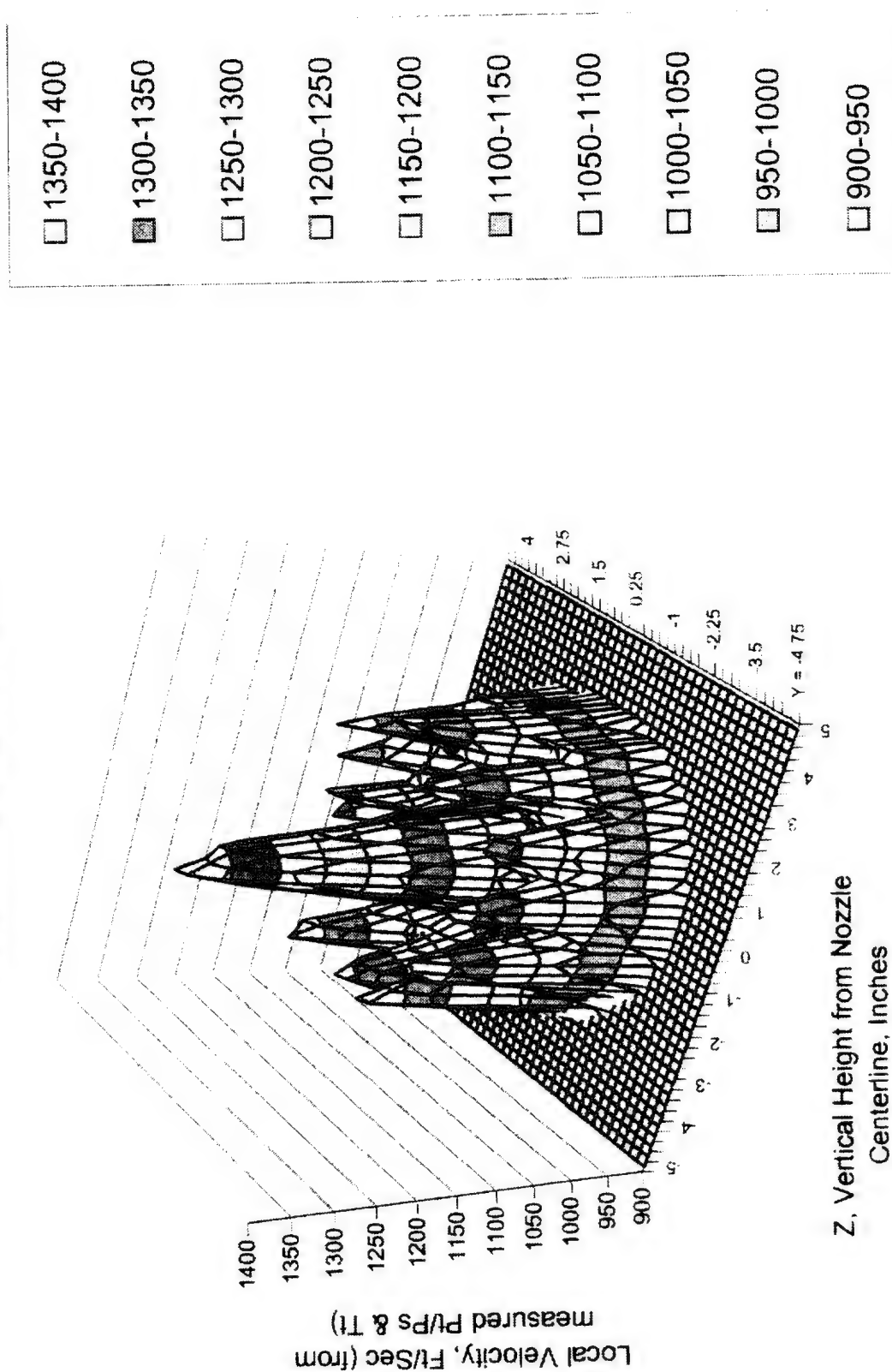




FIGURE 42(c)

12L Baseline Mixer w/100% Nozzle Length, Velocity Survey at  $x/D=1.0$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core(Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V577

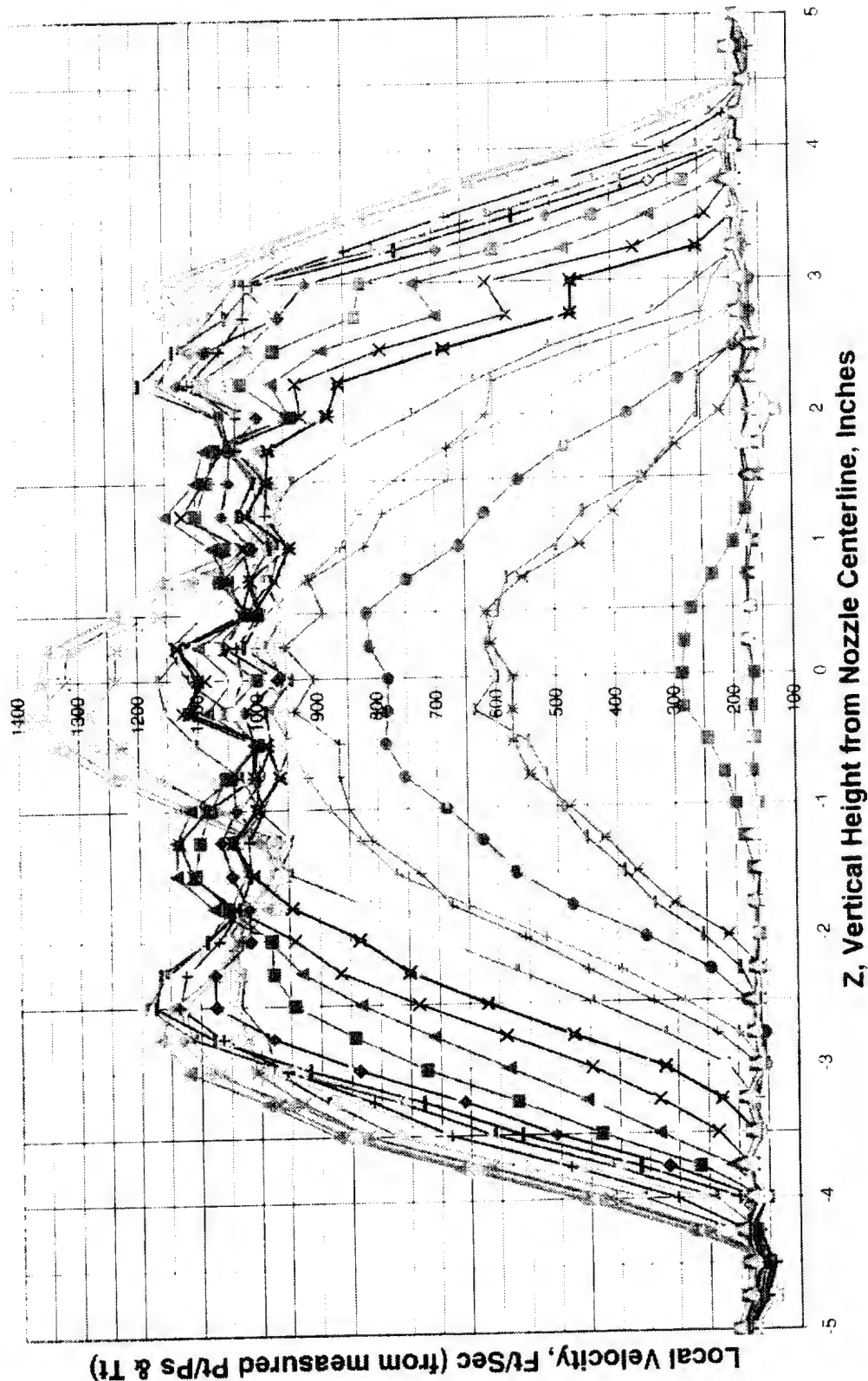




FIGURE 43

12L Baseline Mixer w/100% Nozzle length, Velocity Survey at  $x/D=3.0$ , 1.74 NPR)core,1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRc Acoustic Mixer/Plume Tests Rdg # V579

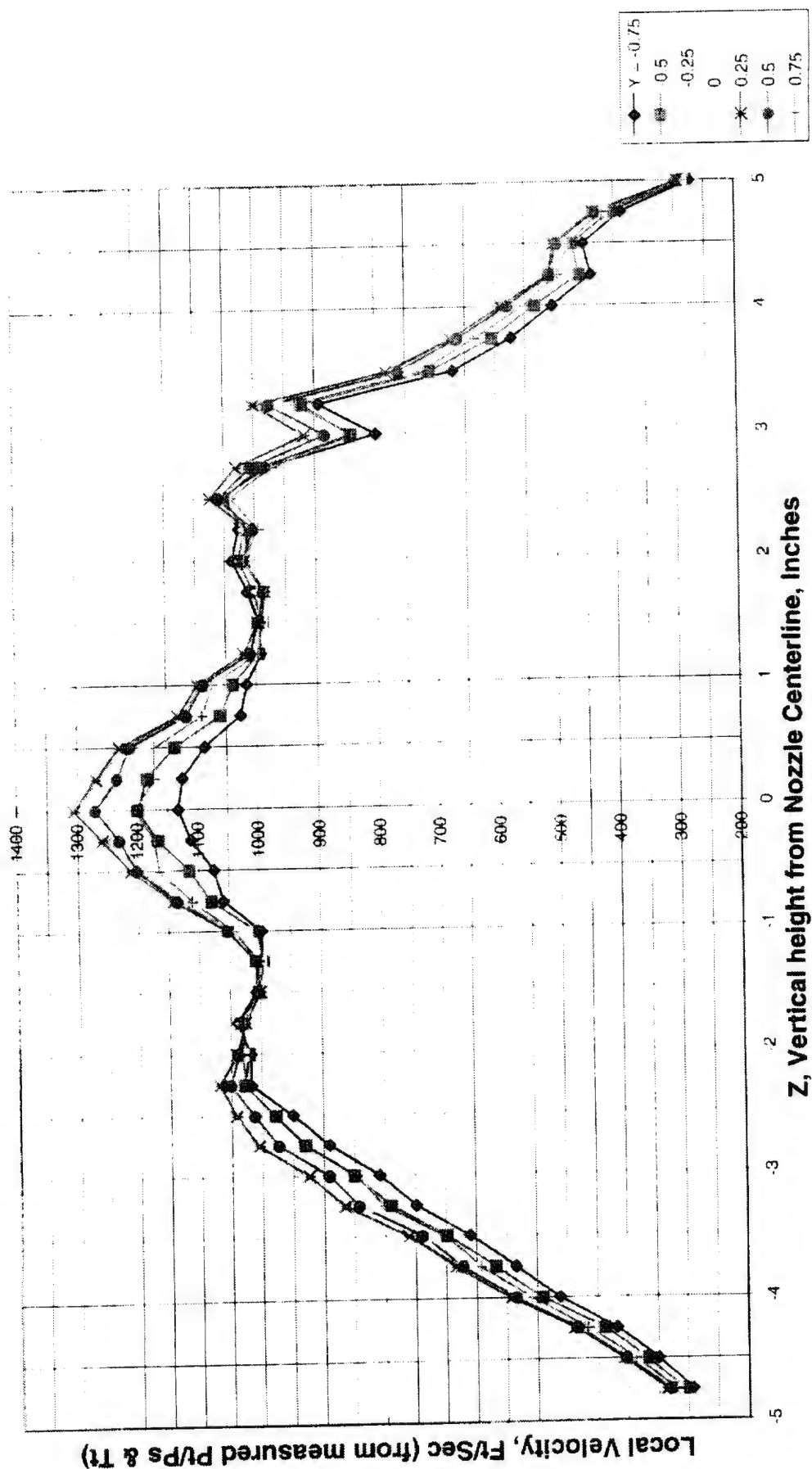




FIGURE 44

12L Baseline Mixer w/100% Nozzle Length, Velocity Survey at  $x/D=5.0$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V580

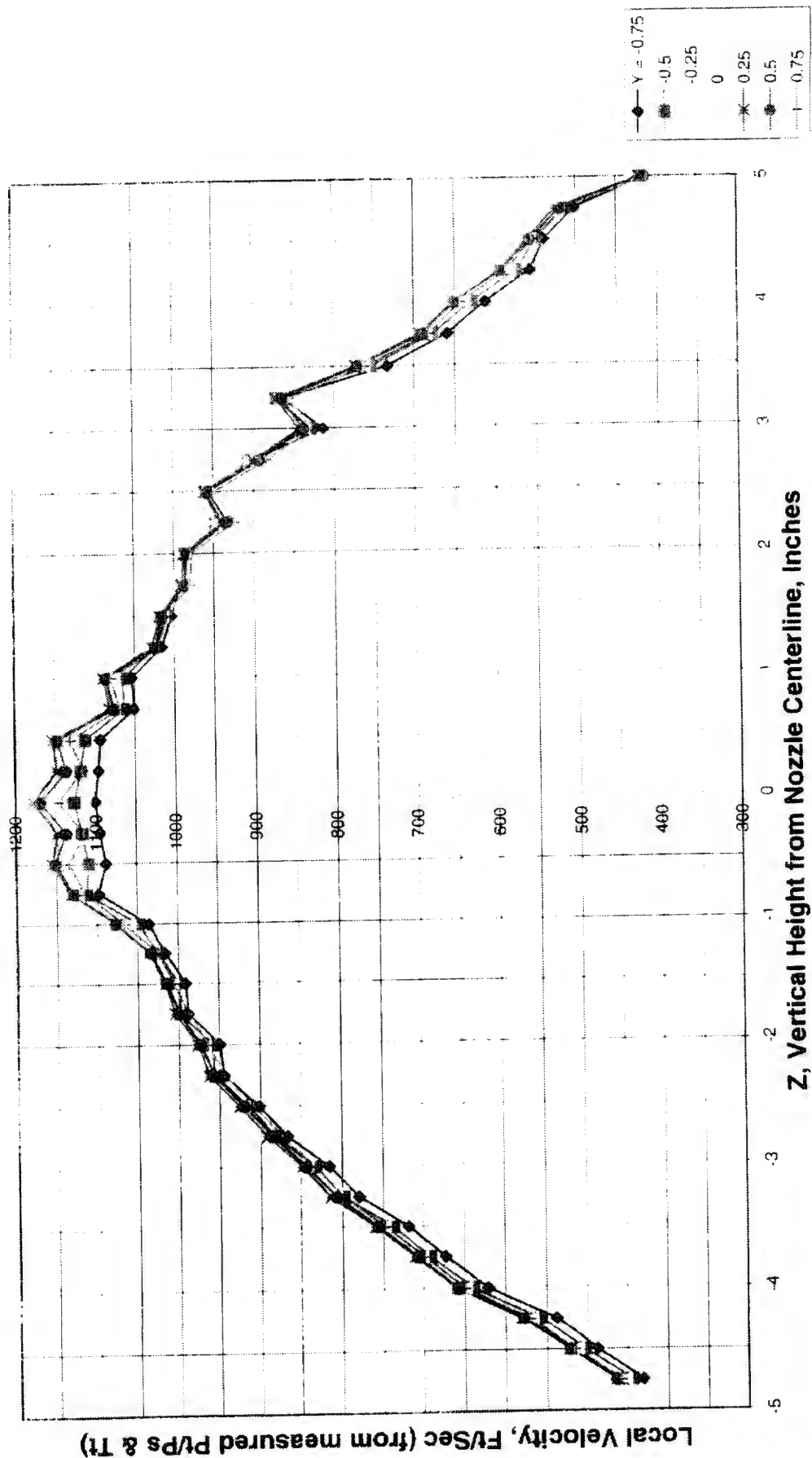
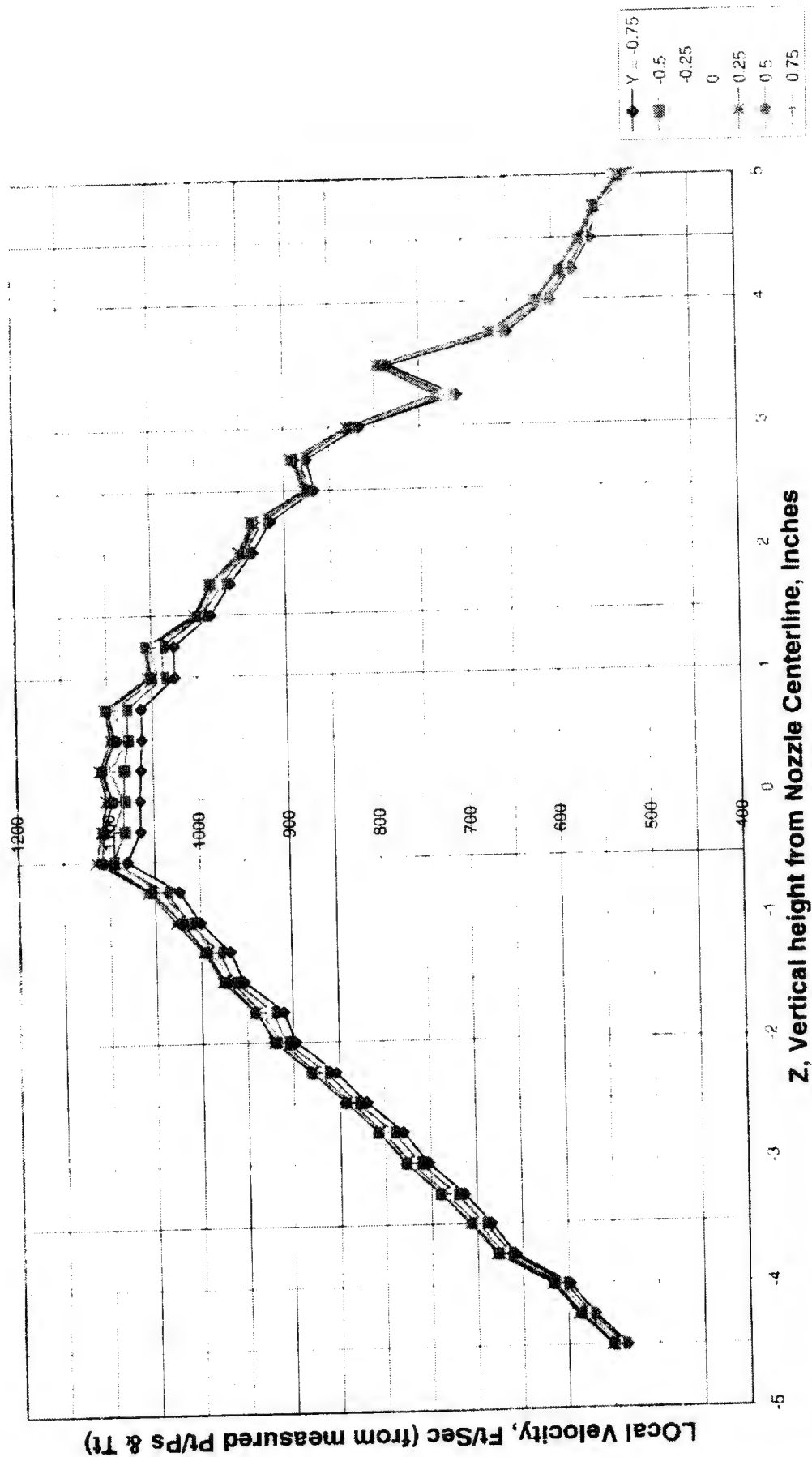




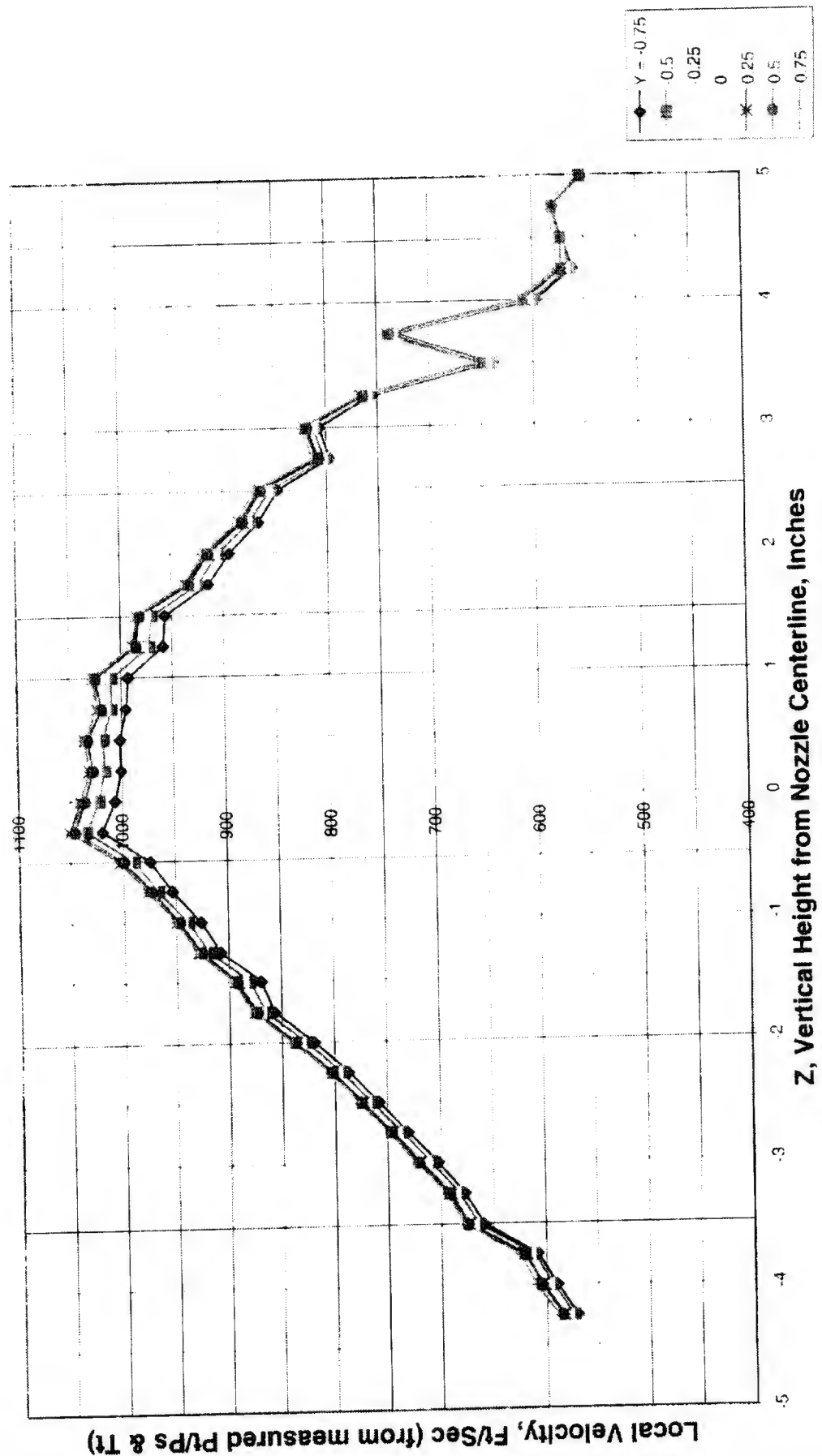
FIGURE 45

12L Baseline Mixer w/ 100% Nozzle Length, Velocity Survey at  $x/D=7.5$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V581





12L Baseline Mixer w/ 100% Nozzle Length, Velocity Survey at  $x/D=10.0$ , 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V582





**Figure 47. 12 L Baseline Mixer (12CL) w/ 100% Nozzle Length Velocity Survey at  $x/D=0.2$ , 1.74 NPR)core, 1.82 NPR)core, 0.2 Mn)FS, 2.79Tt)core/Tt)fan, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V597**

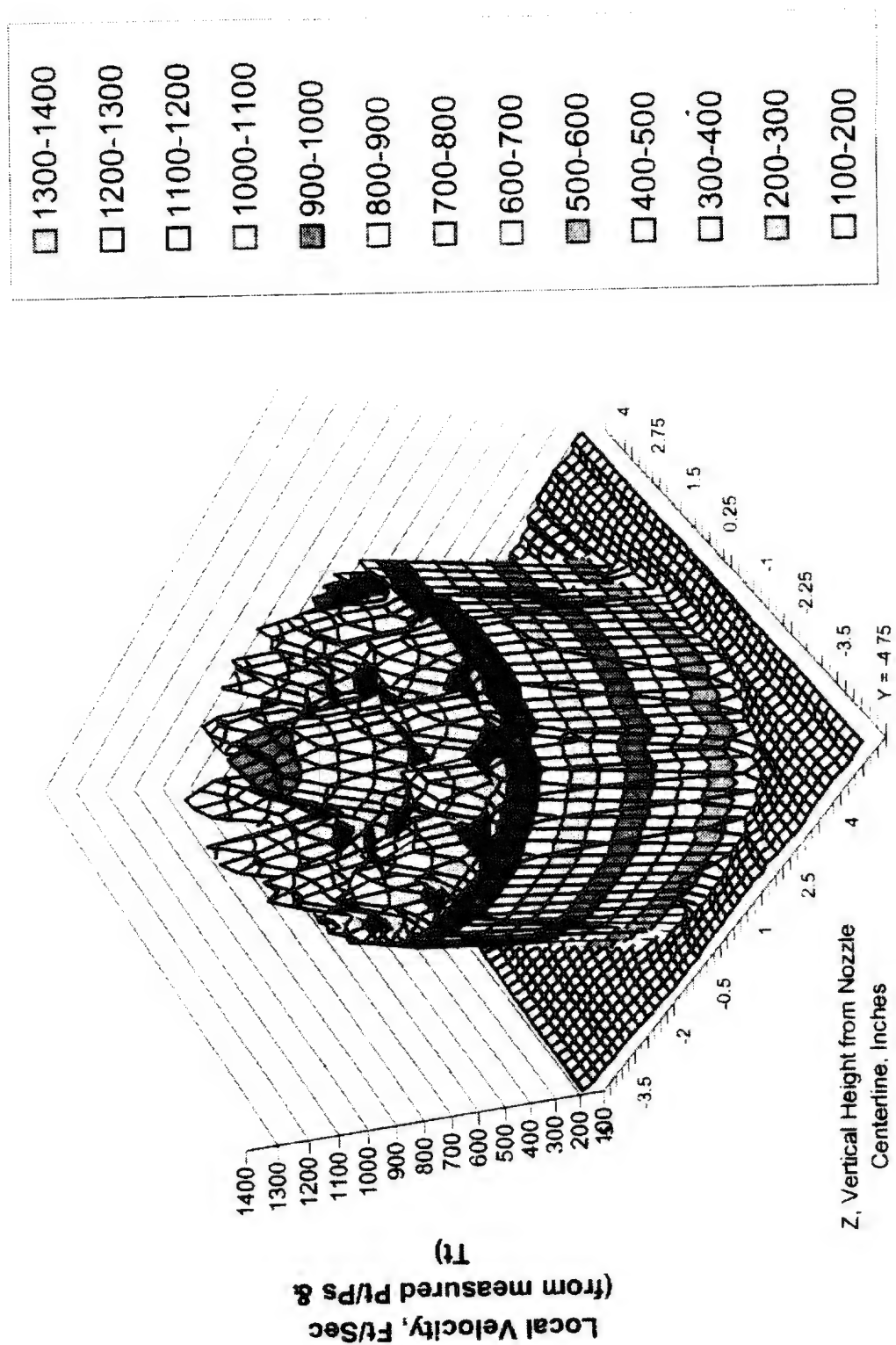




FIGURE 48

12L Baseline Mixer w/50% Nozzle Length Velocity Survey at  $x/D=0.5$ , 1.74 NPR)core, 1.82 NPR)fan, 0.2 Mn)FS, 2.79 Tt)core/Tt)fan, 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg# V598

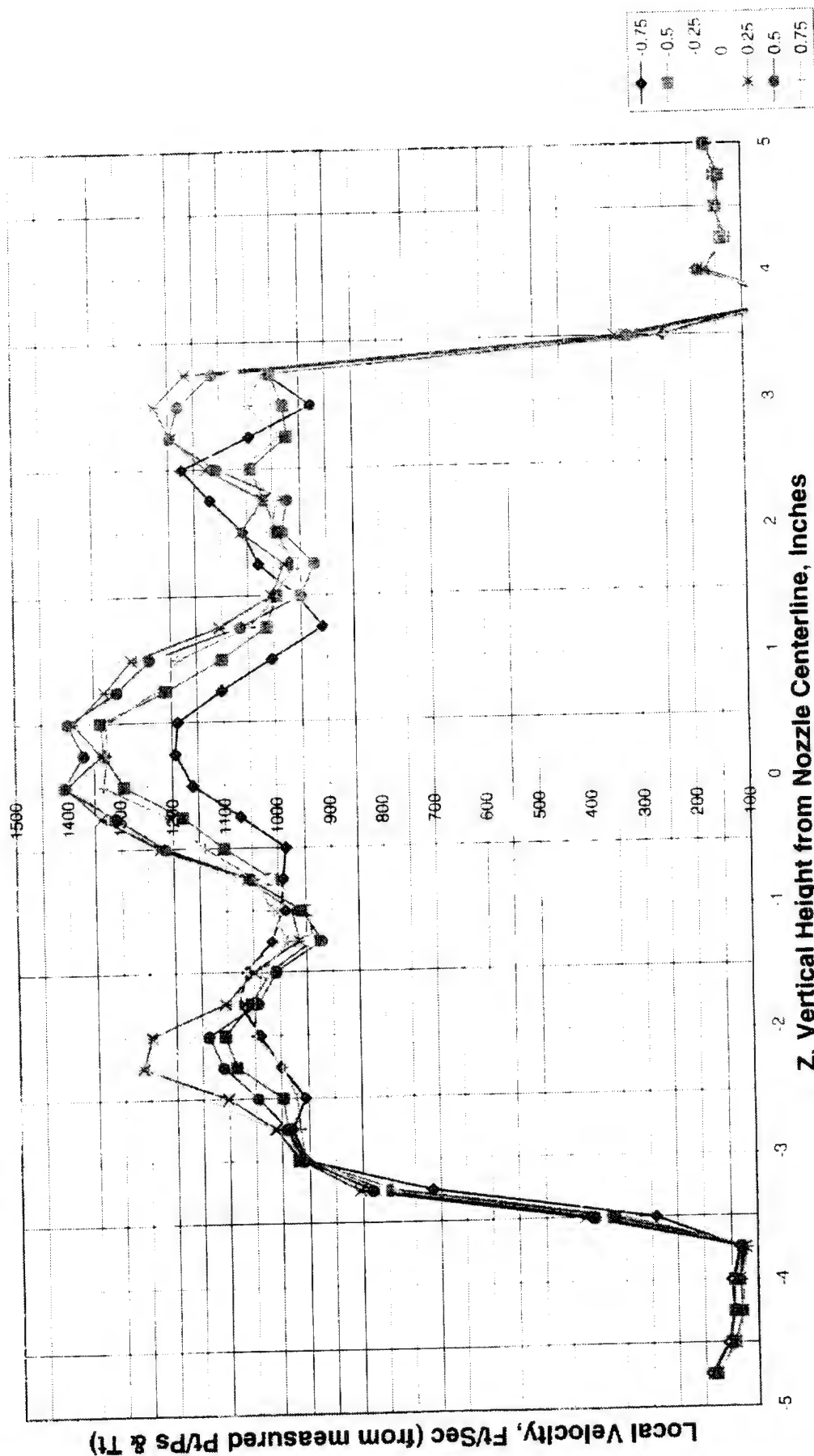




FIGURE 49

12L Baseline Mixer w/50% Nozzle Length Velocity Survey at  $x/D=1.0$ , 1.74 NPR)core, 1.82 NPR)fan, 0.2 Mn)FS, 2.79 Tt)core/Tt)fan, 1966 NASA-LeRC Acoustic Mixer/Plume Tests Rdg# V599

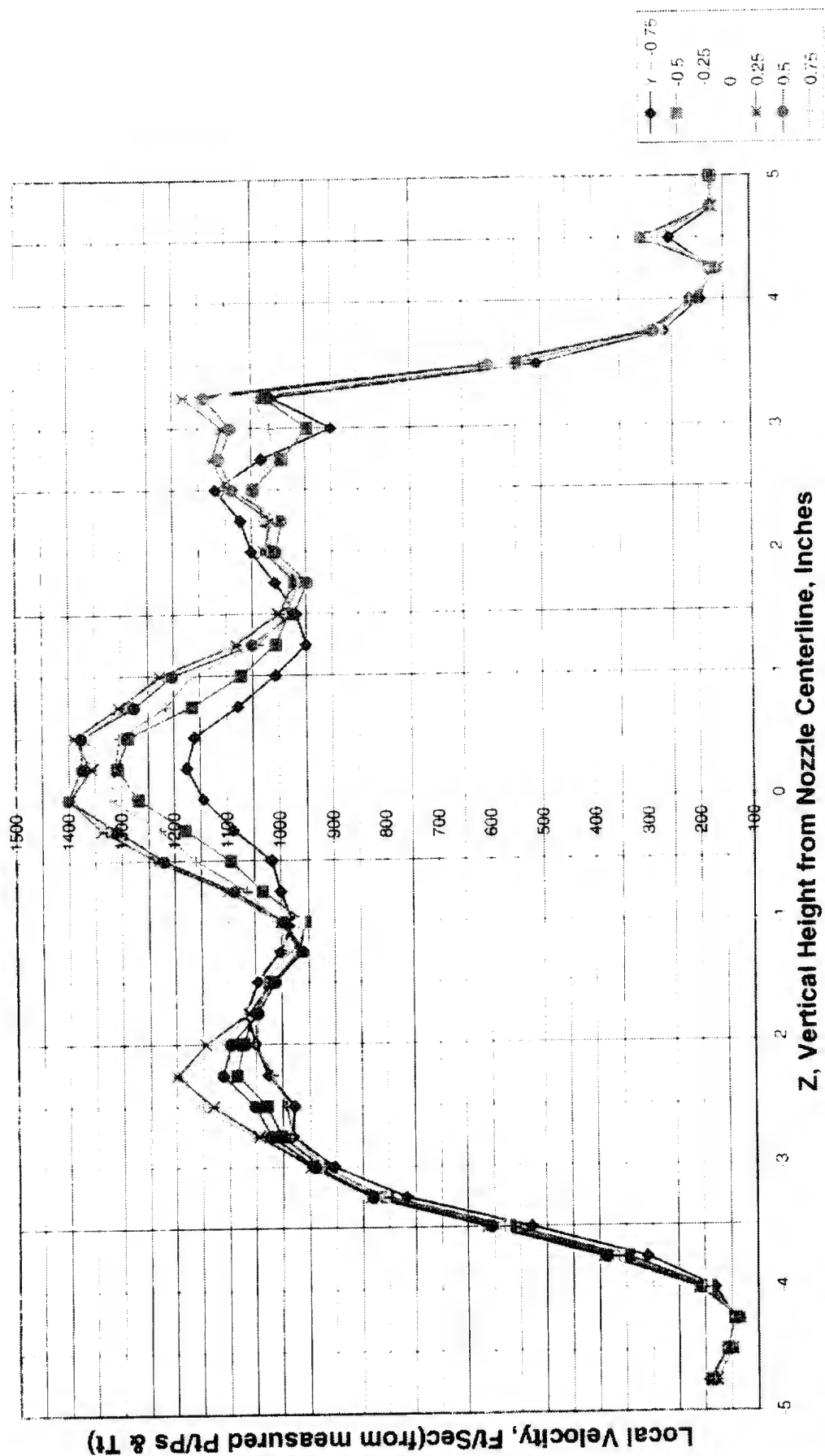




FIGURE 50

12L Baseline Mixer w/50% Nozzle Length Velocity Survey at  $x/D=3.0$ , 1.74 NPR)core, 1.82 NPR)fan, 0.2 Mn)FS, 2.79 Tt)core(Tt)fan, 1966 NASA-LeRC Acoustic Mixer/Plume Tests Rdg# V600

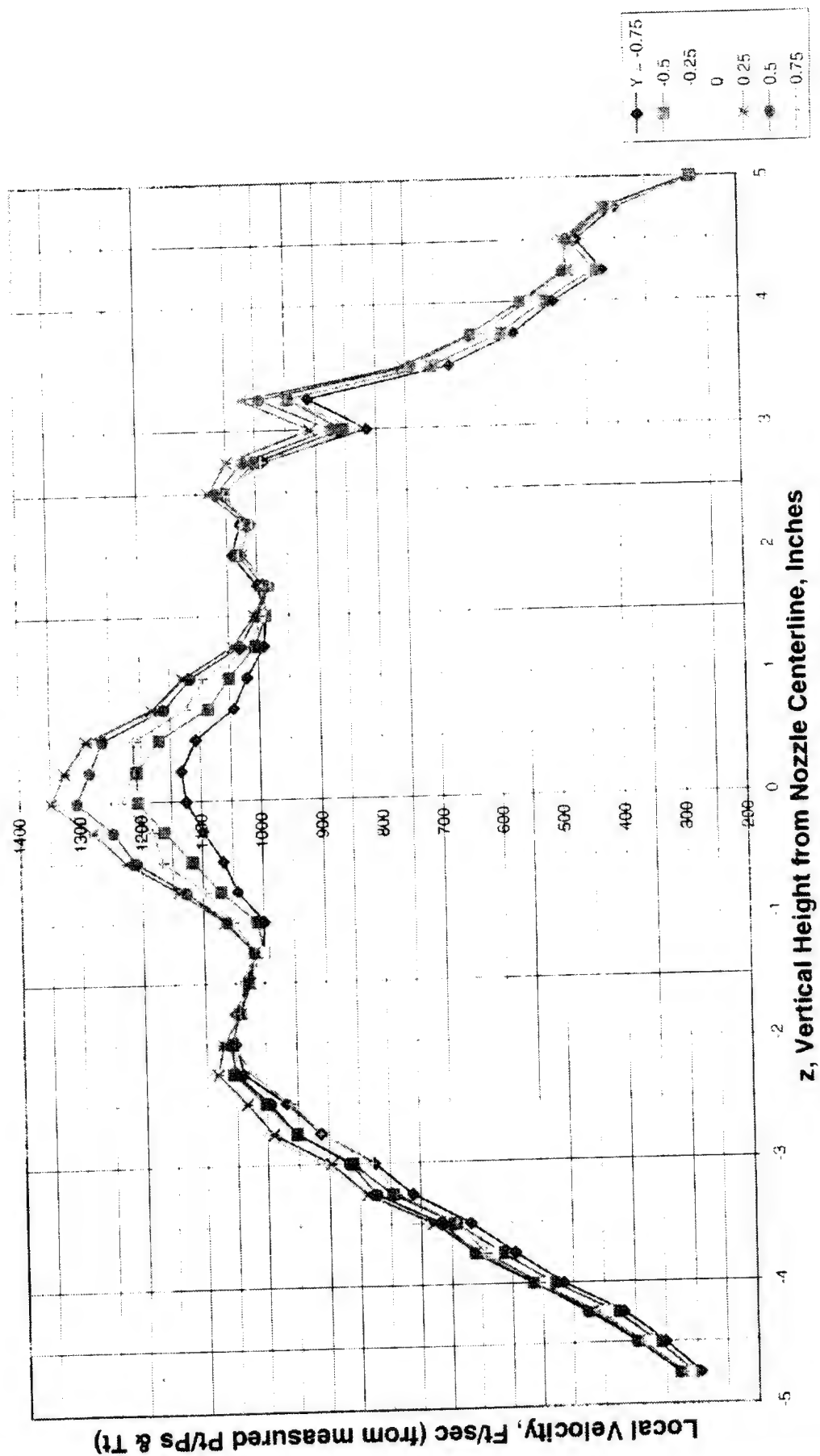




FIGURE 51

12L Baseline Mixer w/50% Nozzle Length Velocity Survey at  $x/D=5.0$ , 1.74 NPR)core, 1.82 NPR)fan, 0.2 Mn)FS, 2.79 Tt)core/Tt)fan, 1966 NASA-LeRC Acoustic Mixer/Plume Tests Rdg# V601

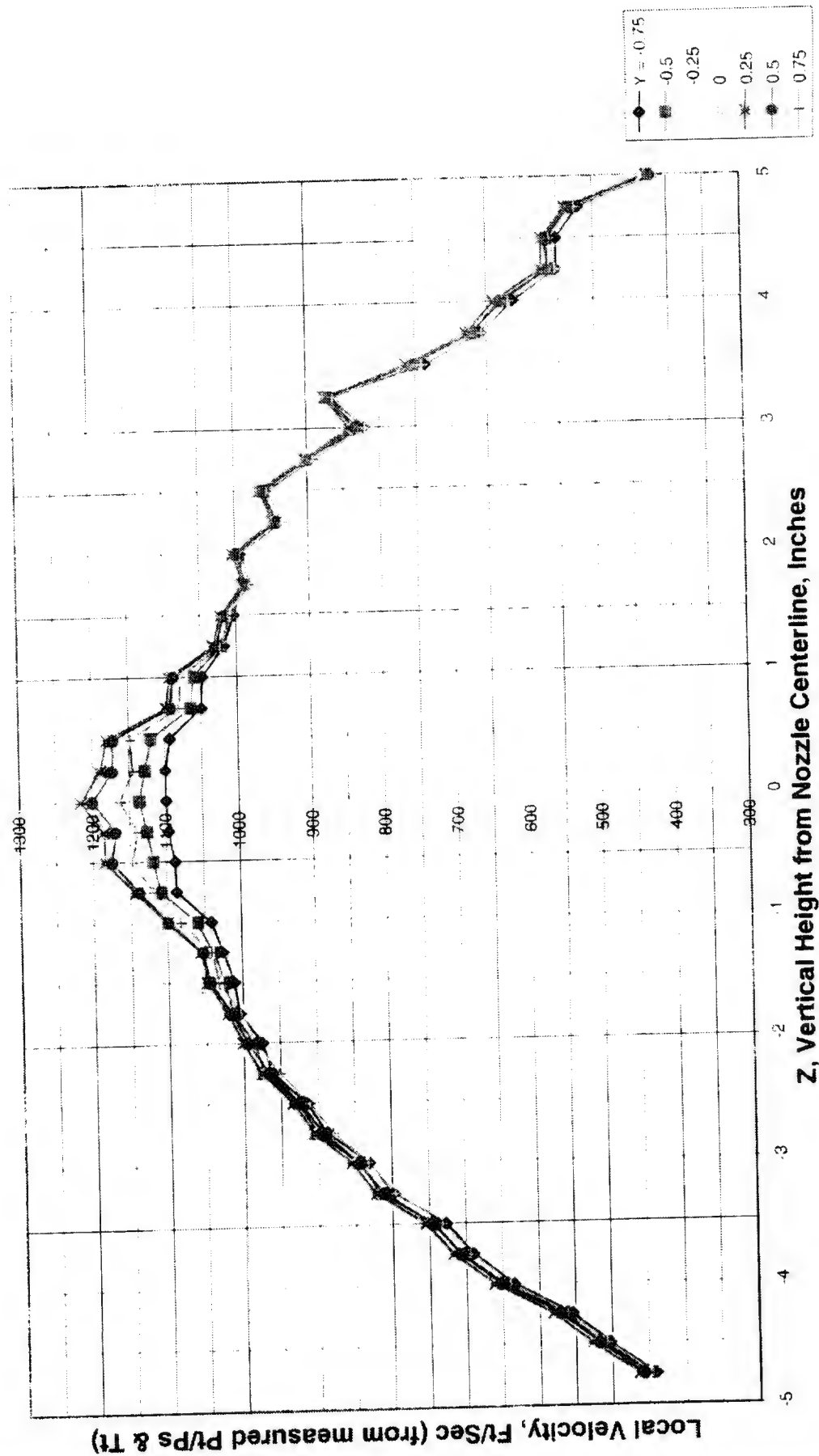




FIGURE 52

12L Baseline Mixer w/50% Nozzle Length Velocity Survey at  $x/D=7.5$ , 1.74 NPR)core, 1.82 NPR)fan, 0.2 Mn)FS, 2.79 Tt)core/Tt)fan, 1966 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # V602

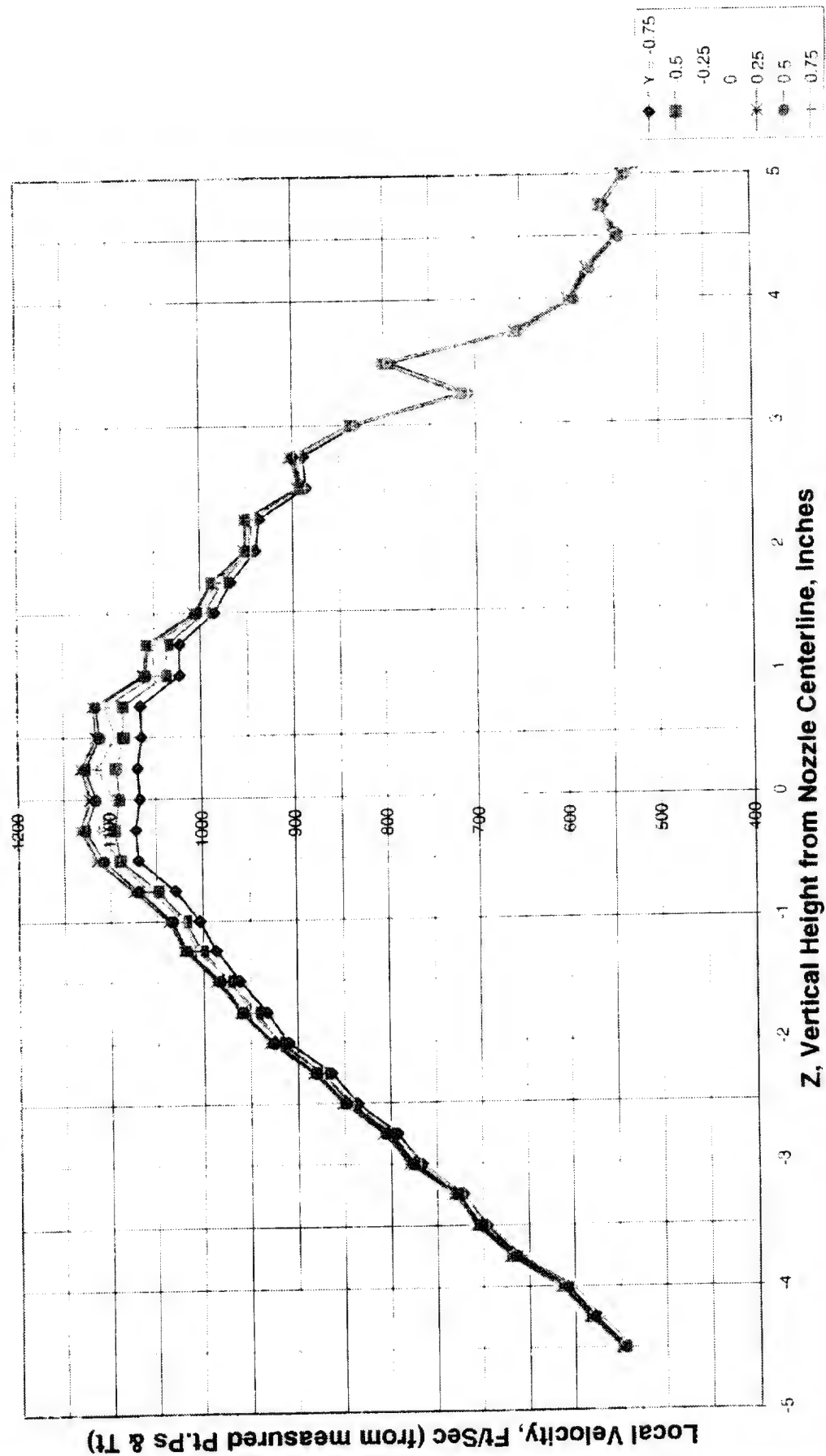
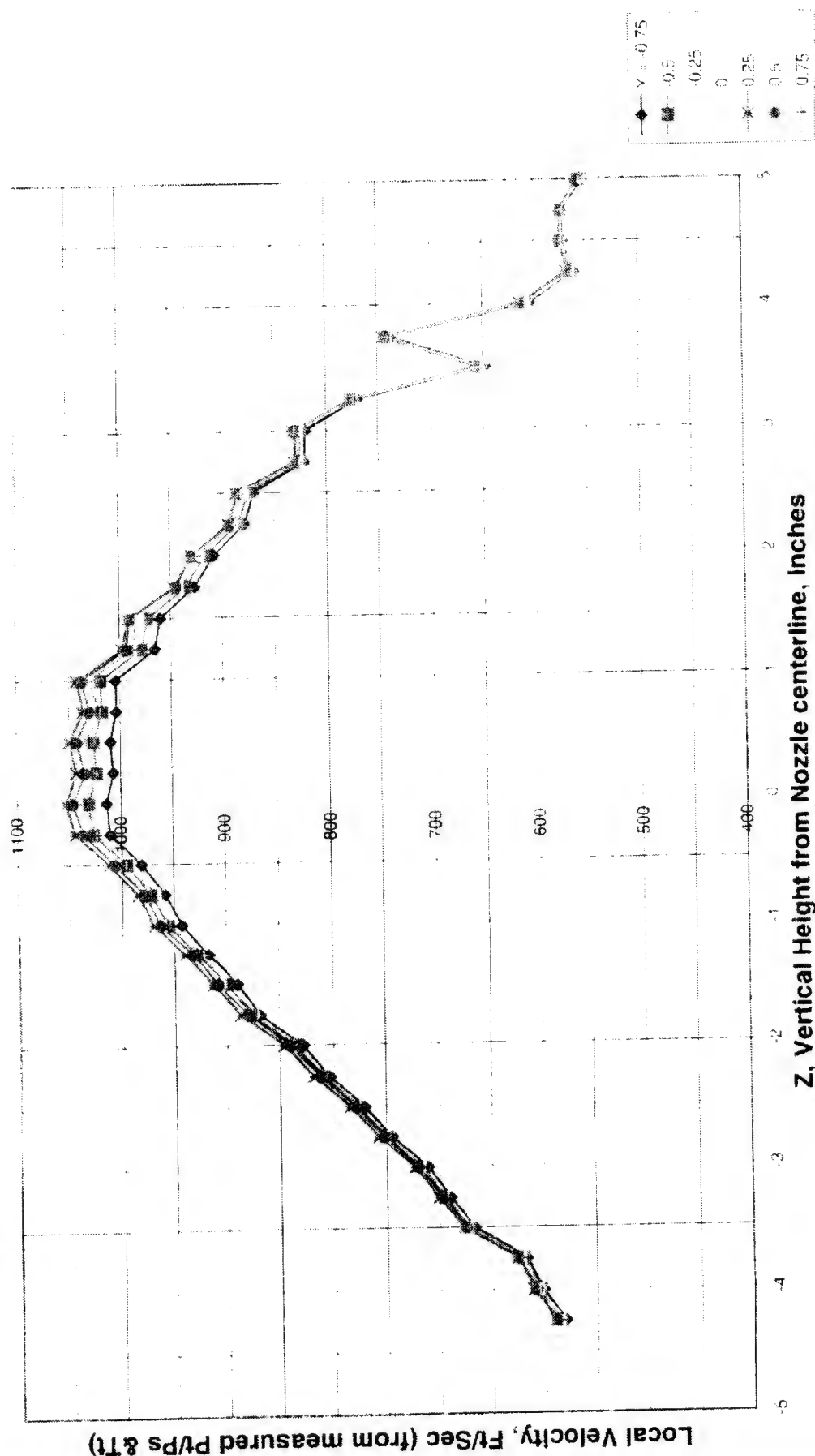




FIGURE 53

12L Baseline Mixer w/50% Nozzle Length Velocity Survey at  $x/D=10.0$ , 1.74 NPR)core, 1.82 NPR)fan, 0.2 Mn)FS, 2.79 Tt)core/Tt)fan, 1966 NASA-LeRC Acoustic Mixer/Plume Tests Rdg #V603





20L Deep Scalloped Mixer W/100% Nozzle Length -  $x/D=0.5$ , 1.74 NPR)core. 1.82 NPR)fan, 2.79  
Tt)coreTt)fan, Rdg# V542 - 1996 NASA-LeRC Acoustic Mixer/Plume Test

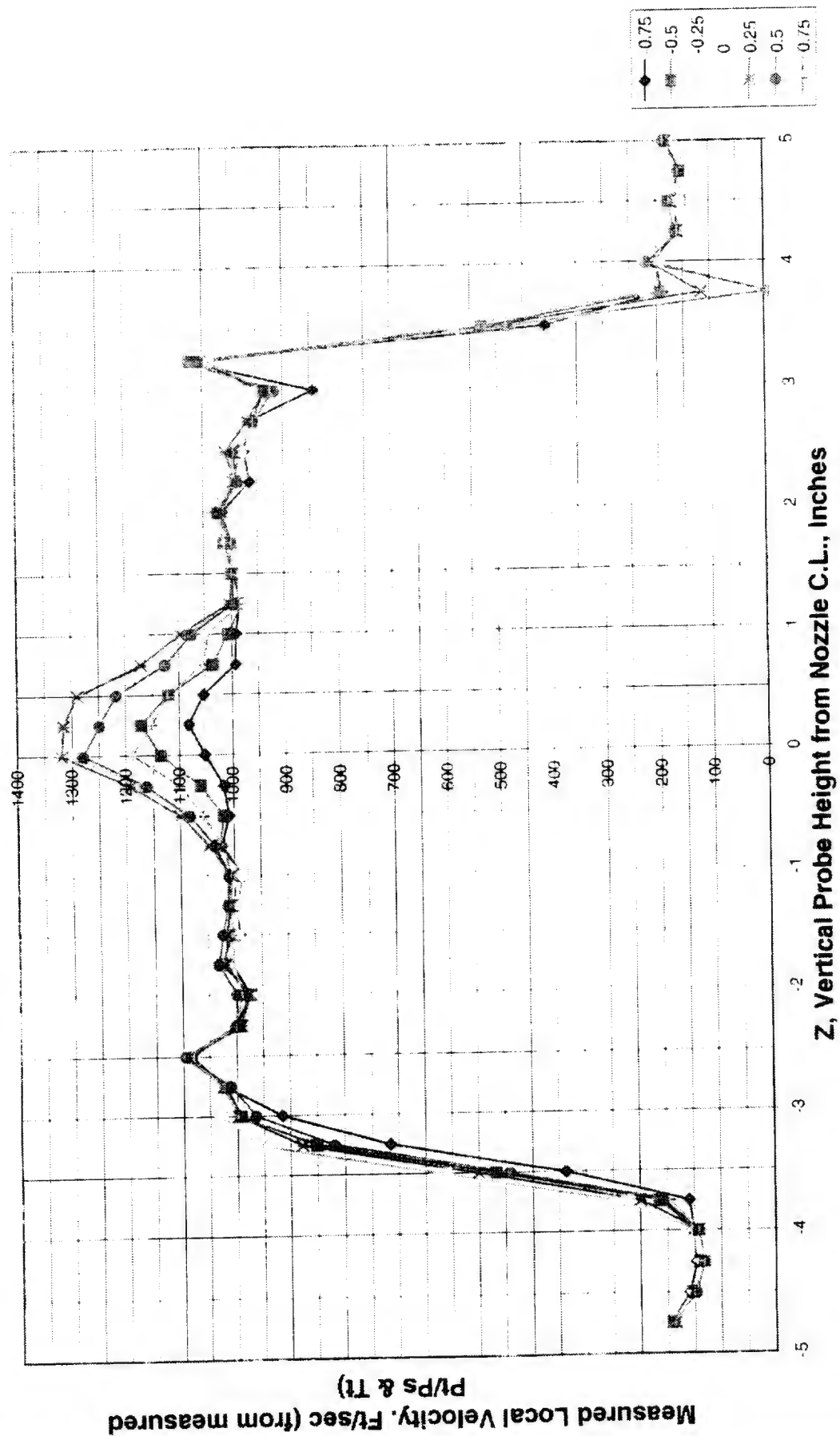




Figure 55(a). Velocity Profile at  $x/D=1.0$ , 20L Deep Scalloped Mixer (20DH) w/100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan 2.79 Tt)core(Tt)fan, Rdg# V541 - 1996 NASA-LeRC  
Acoustic Mixer/Plume Test

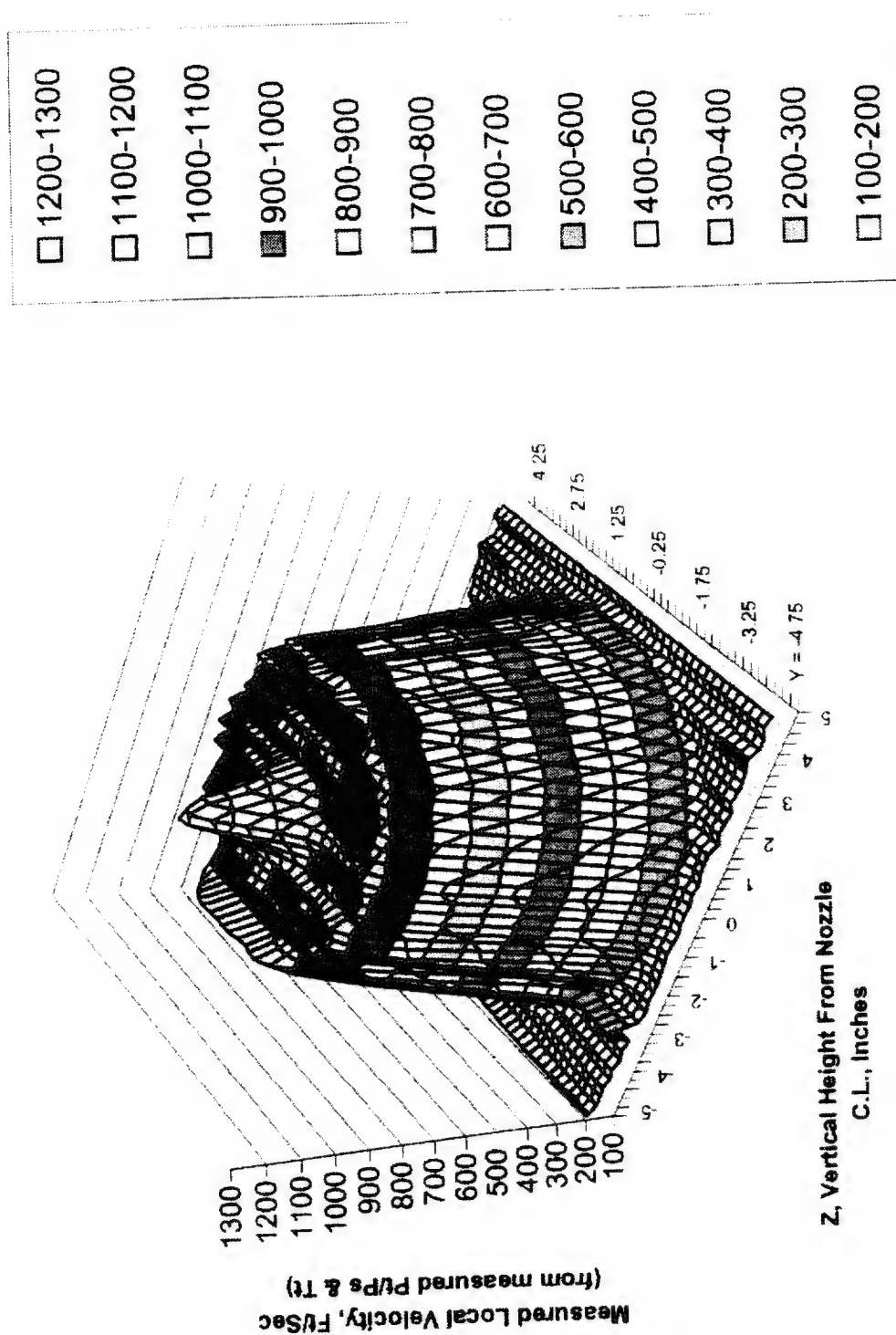




FIGURE 55 (b)

Velocity Profile at  $x/D=1.0$ , 20L Deep Scalloped Mixer w/100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan 2.79 Tt)core/Tt)fan, Rdg# V541 - 1996 NASA-LeRC Acoustic Mixer/Plume Test

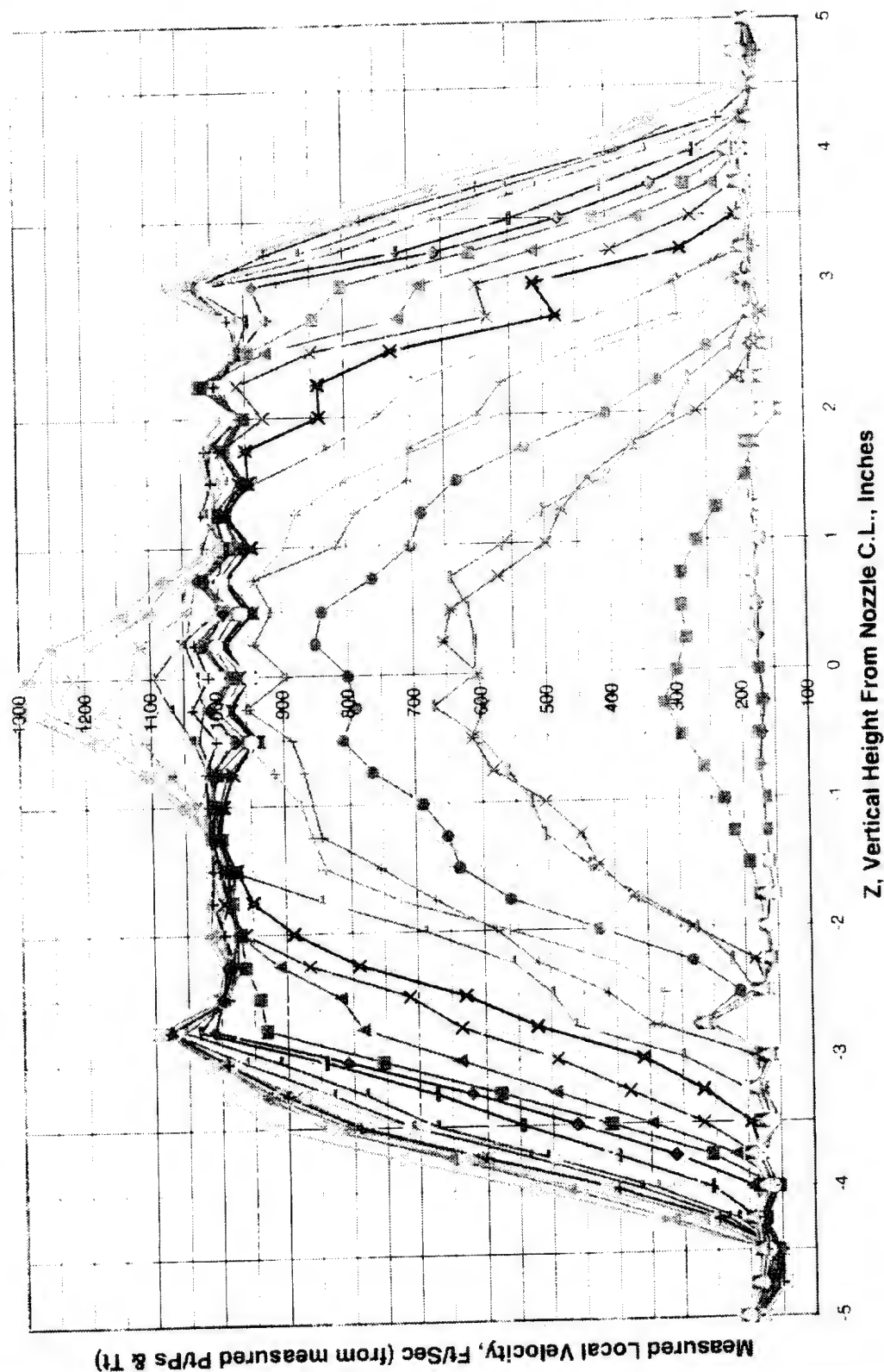




FIGURE 56

Velocity Profile at  $x/D=3.0$ , 20L Deep Scalloped Mixer w/100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, Rdg# V543 - 1996 Nasa-LeRC Acoustic Mixer/Plume Test

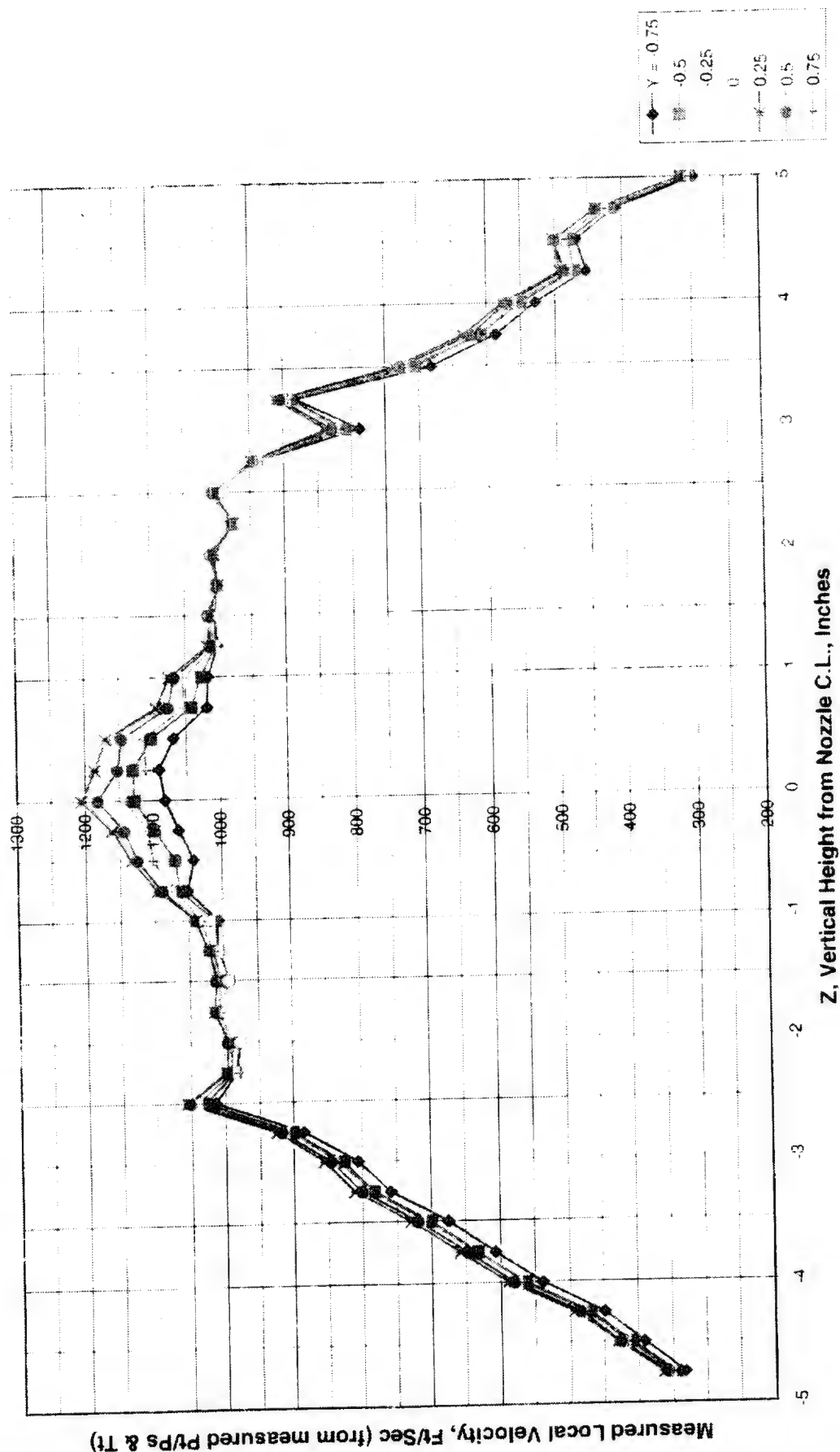




FIGURE 57

Velocity Profile at  $x/D=5.0$ , 20L Deep Scalloped Mixer w/100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan, 2.79 Rt)core/Tt)fan, Rdg# V544 - 1996 NASA-LeRC Acoustic Mixer/Plume Test

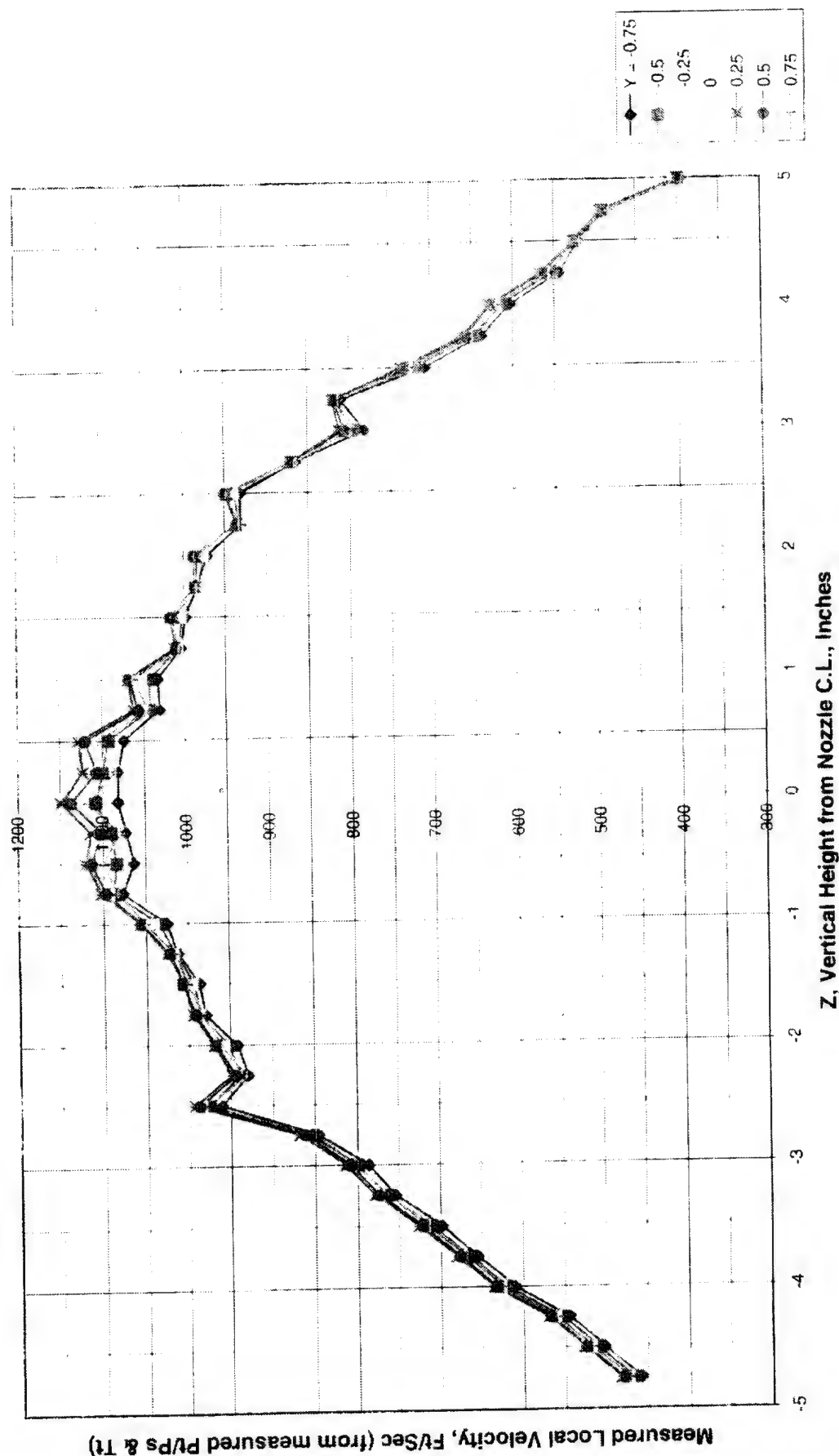




FIGURE 58

Velocity Profile at  $x/D=7.5$ , 20L Deep Scalloped Mixer w/100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)fan, Rdg# V545 - 1996 NASA - LeRC Acoustic Mixer/Plume Test

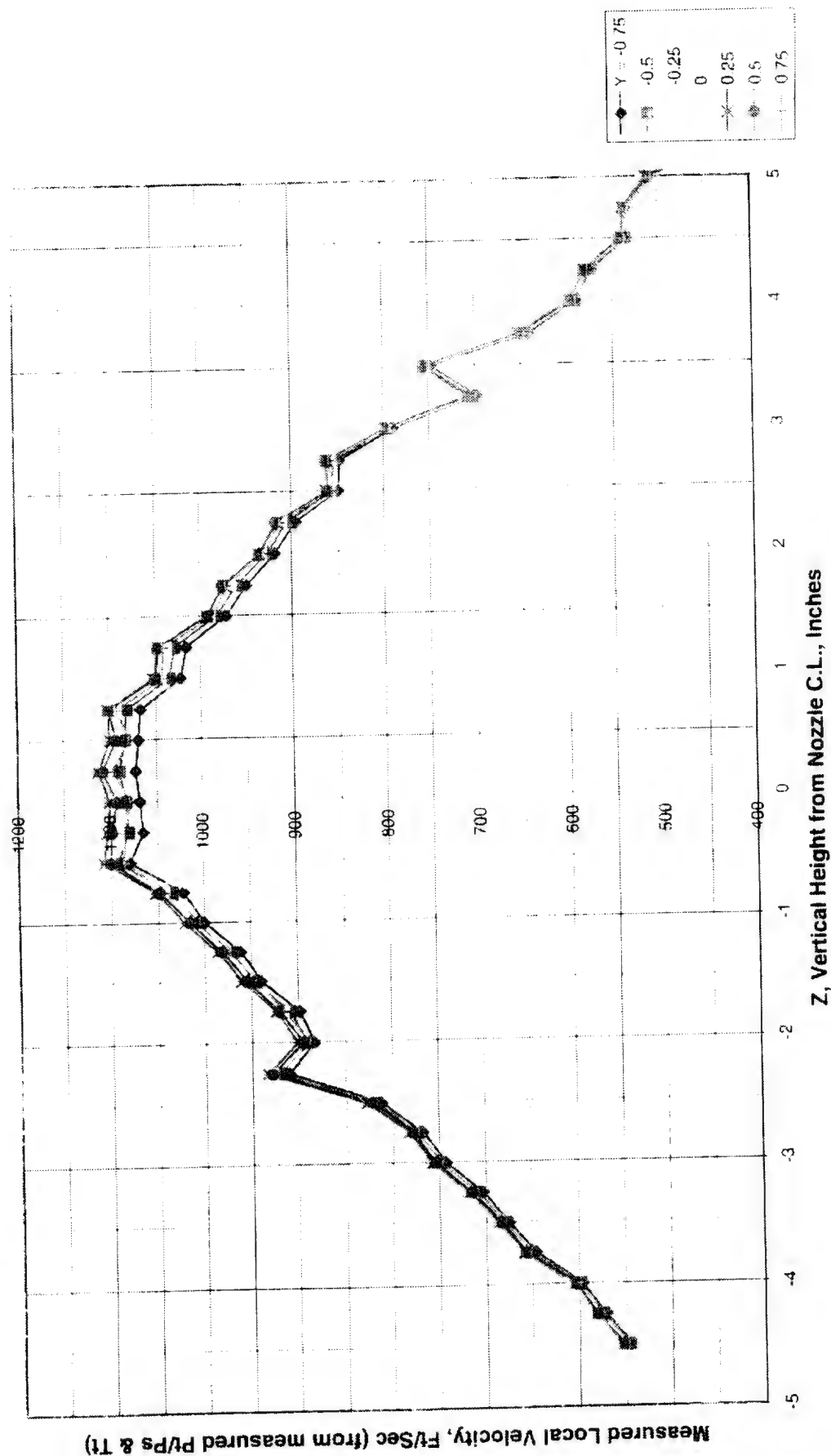
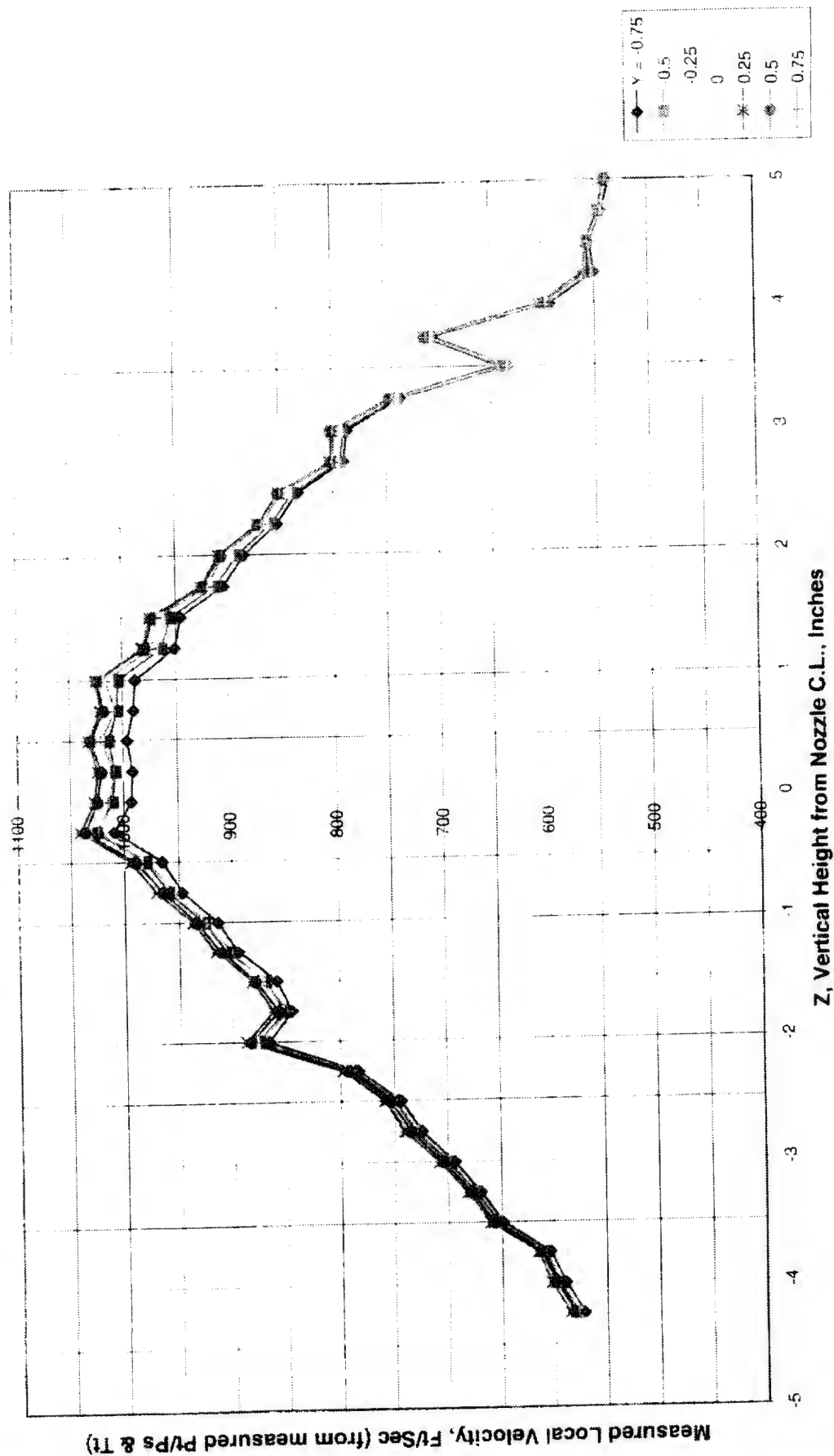




FIGURE 59

Velocity Profile at  $x/D=10$ , 20L Deep Scalloped Mixer w/100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, Rdg# V546 - 1996 NASA-LeRC Acoustic Mixer/Plume Test





**Figure 60. JET WAKE DIAGRAM**  
**20L Deep Mixer, NPR)core=1.39, NPR)fan=1.44, Tt)core/Tt)fan=2.34, 0.2 Mn)FS,**  
**Rdg #s V552 to V557 - 1996 NASA-LeRC Acoustic Mixer/Plume Tests**

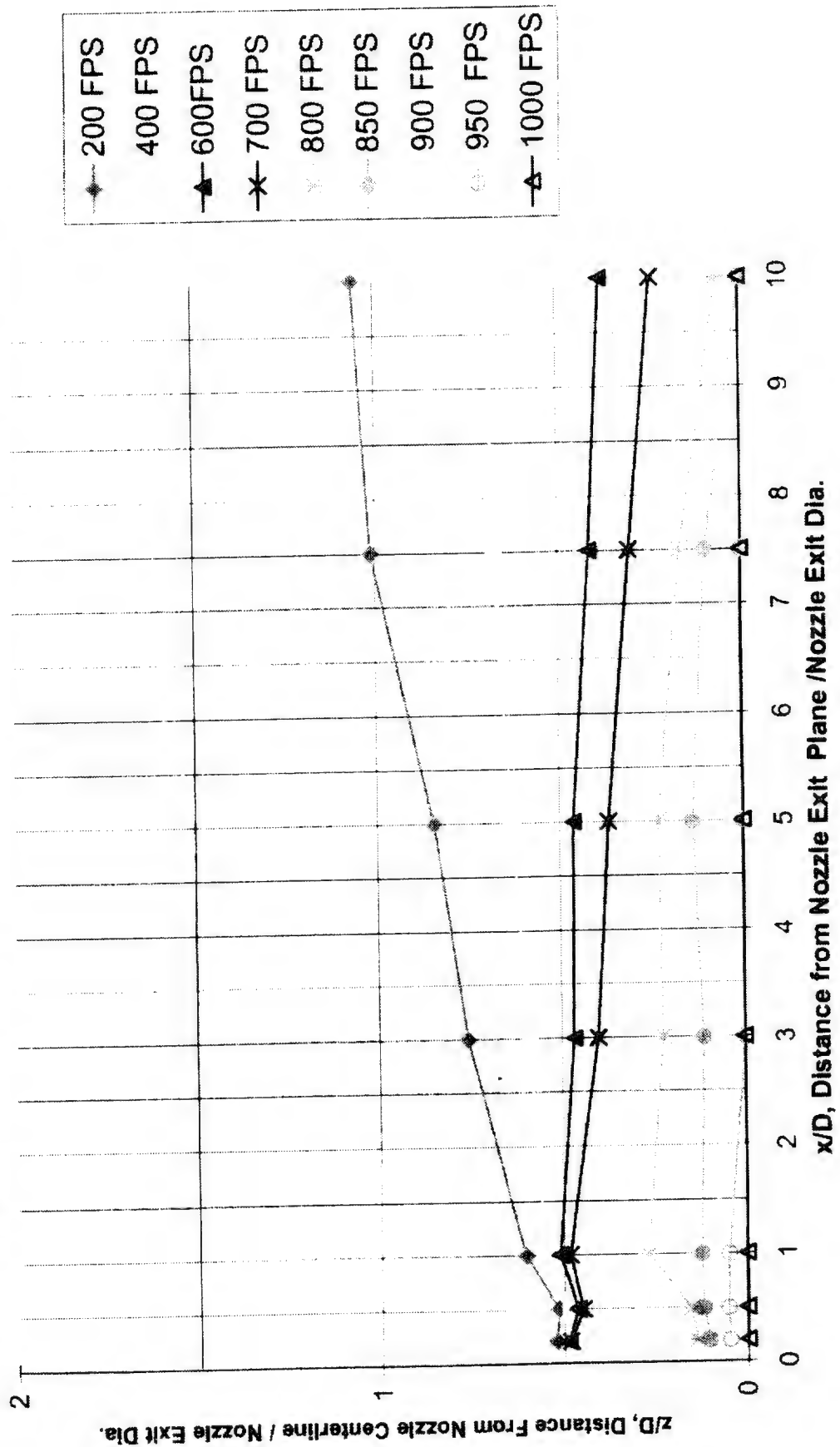
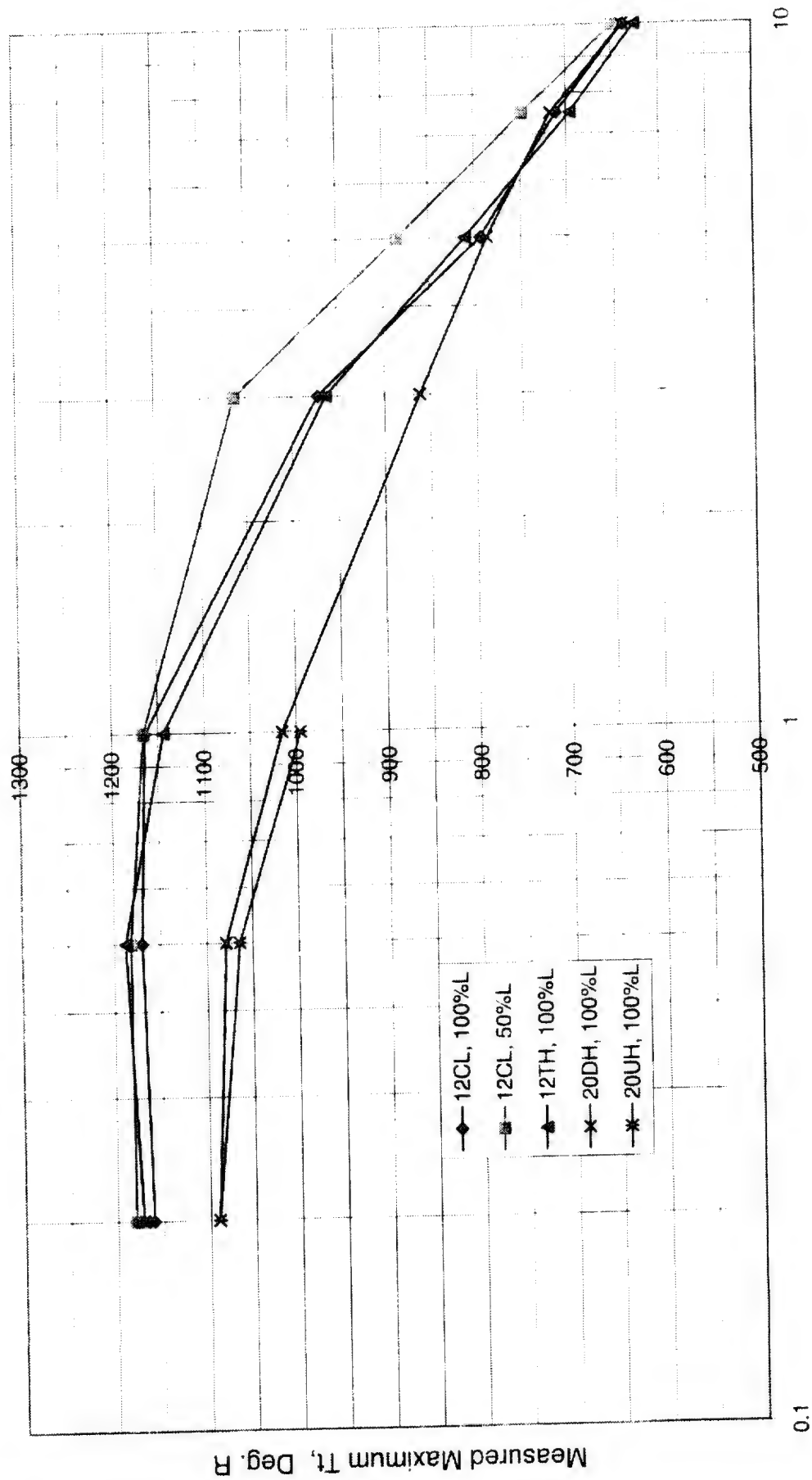




Figure 61. Maximum "Centerline" Total Temperature Decay - 1996 Nasa-LeRC Acoustic Mixer  
Plume Tests - NPR)core=1.39, NPR)fan=1.44, Tt)core/Tt)fan=2.34, Mn)FS=0.2



x/D, Axial Distance From Nozzle Exit Plane / Nozzle Exit Diameter



Maximum "Centerline" Total Temperature Decay, 20L Deep Mixer, 100% Nozzle Length, 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt(core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg #'s TT560, TT559, TT561, TT558, TT549, TT548, TT547

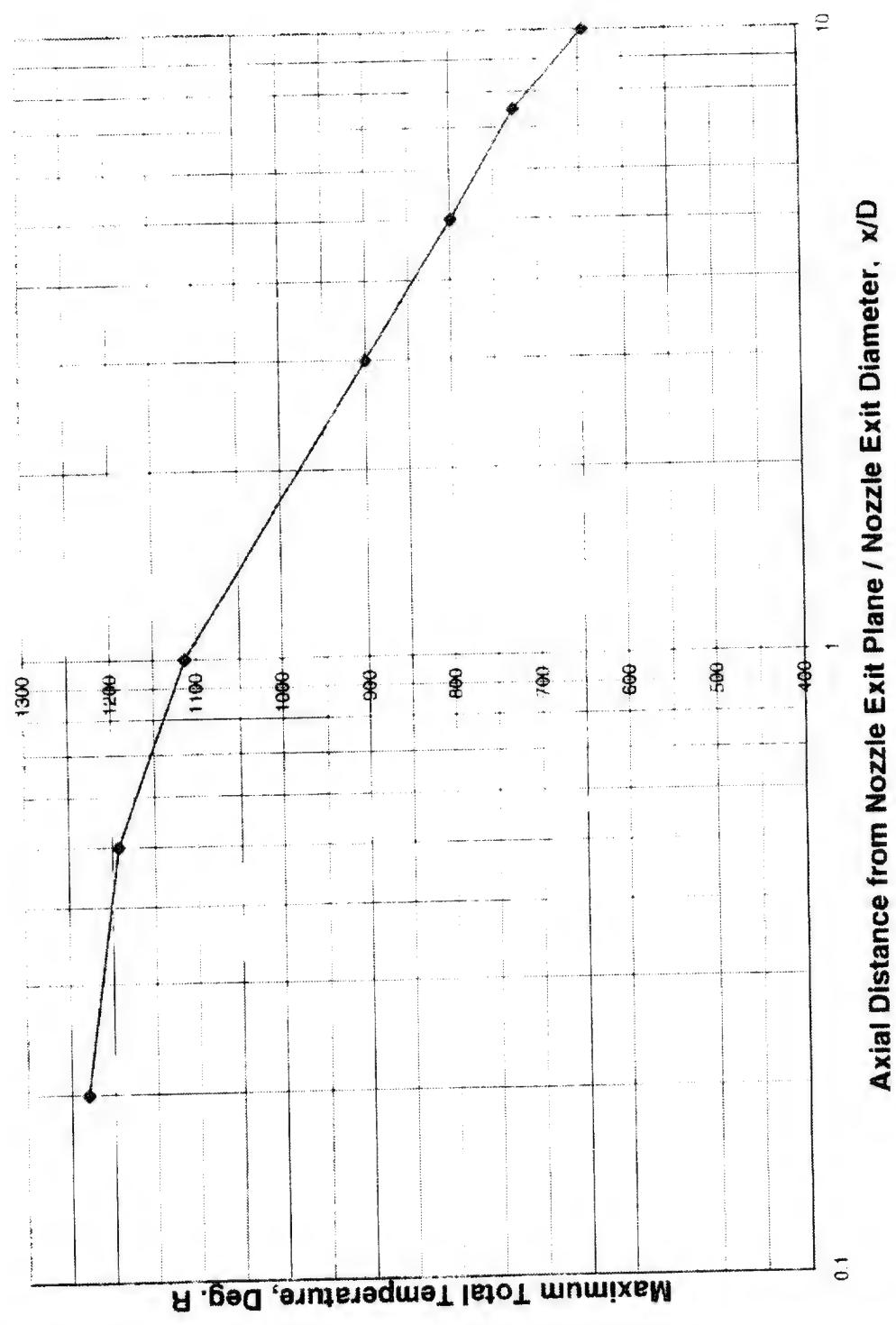


FIGURE 62



FIGURE 63 (a)

Figure 63(a). Zoom in for 20L Deep Mixer (20DH) Tt Survey at  $x/D=0.2$ . NPR)core=1.39, NPR)fan=1.44.  
 Tt)core/Tt)fan=2.34, Mn)FS=0.2; 1996 NASA-LeRC Acoustic Mixer/Plume Test, Rdg# TT550 [Highest Tt at center =  
 1085.3 deg. R]

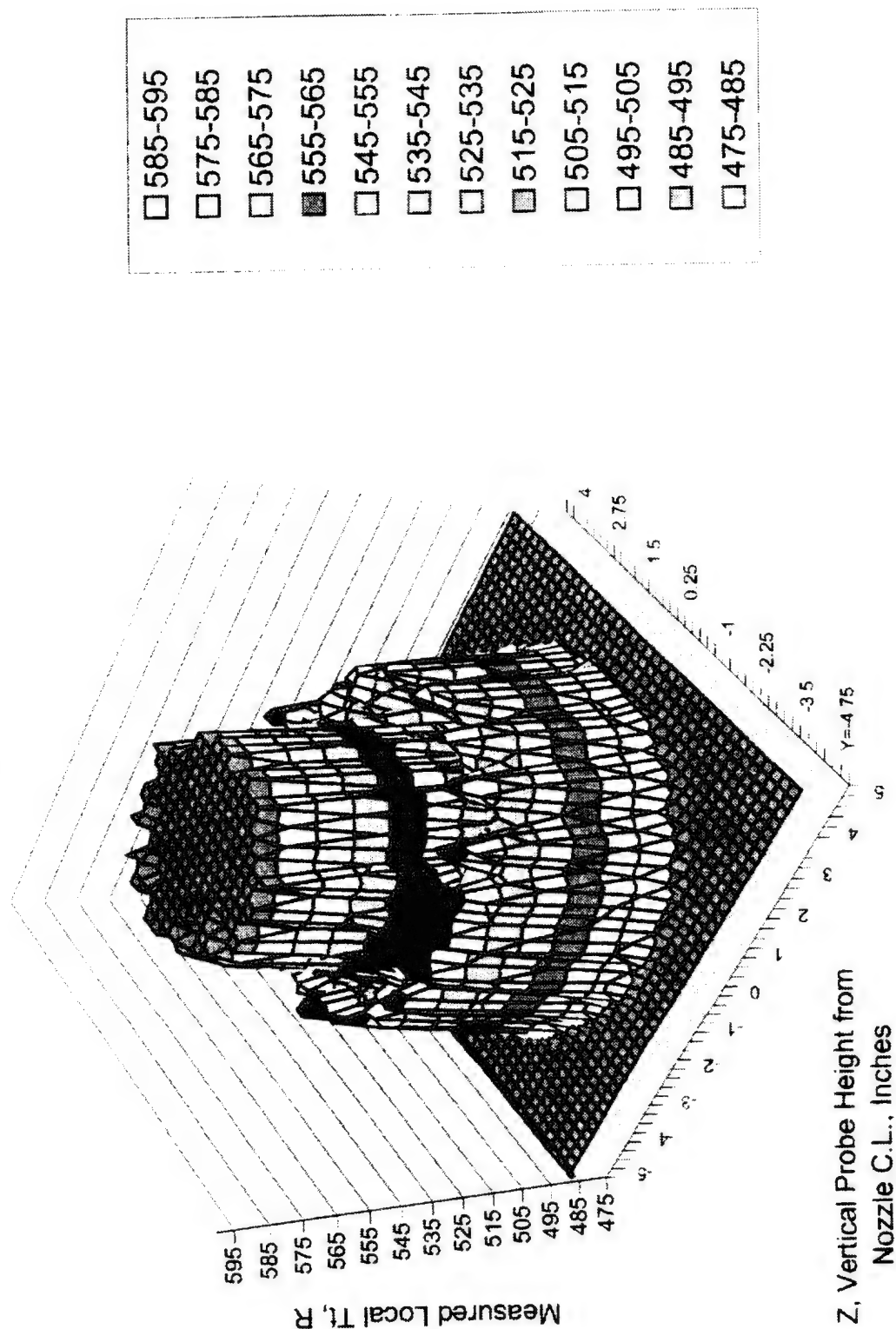




FIGURE 63 (b)

20L Deep Mixer Tt Survey at  $x/D=0.2$ , NPR)core=1.39, NPR)fan=1.44, Tt)core/Tt)fan=2.34,  
Mn)FS=0.2; 1996 NASA-LeRC Acoustic Mixer/Plume Test, Rdg# TT550

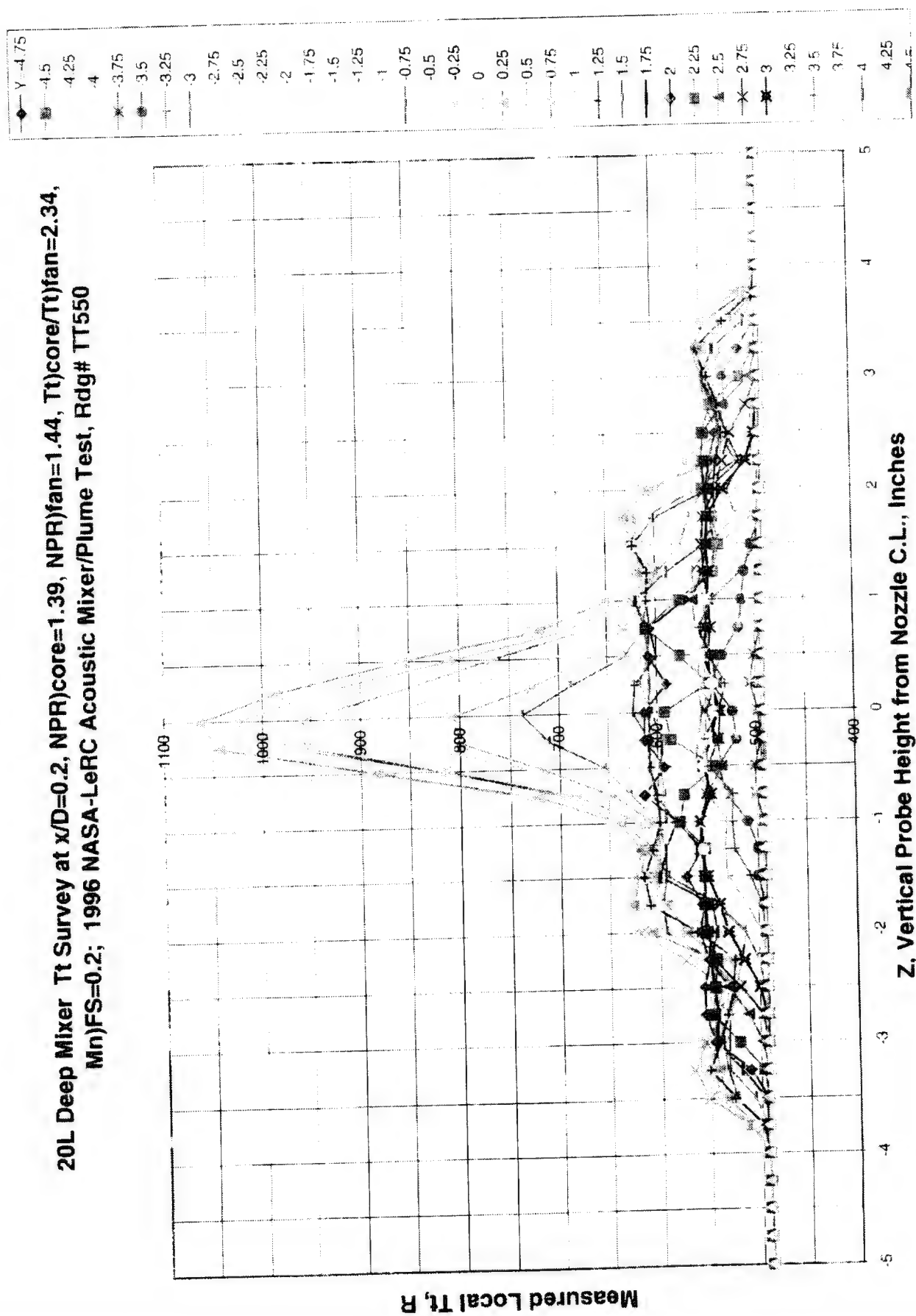




Figure 64(a). 20L Deep Mixer (20DH), Total Temperature Survey at  $x/D=0.2$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62Tt)core/Tt)fan, o.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT560 [Max. Tt = 1230.4 deg R]

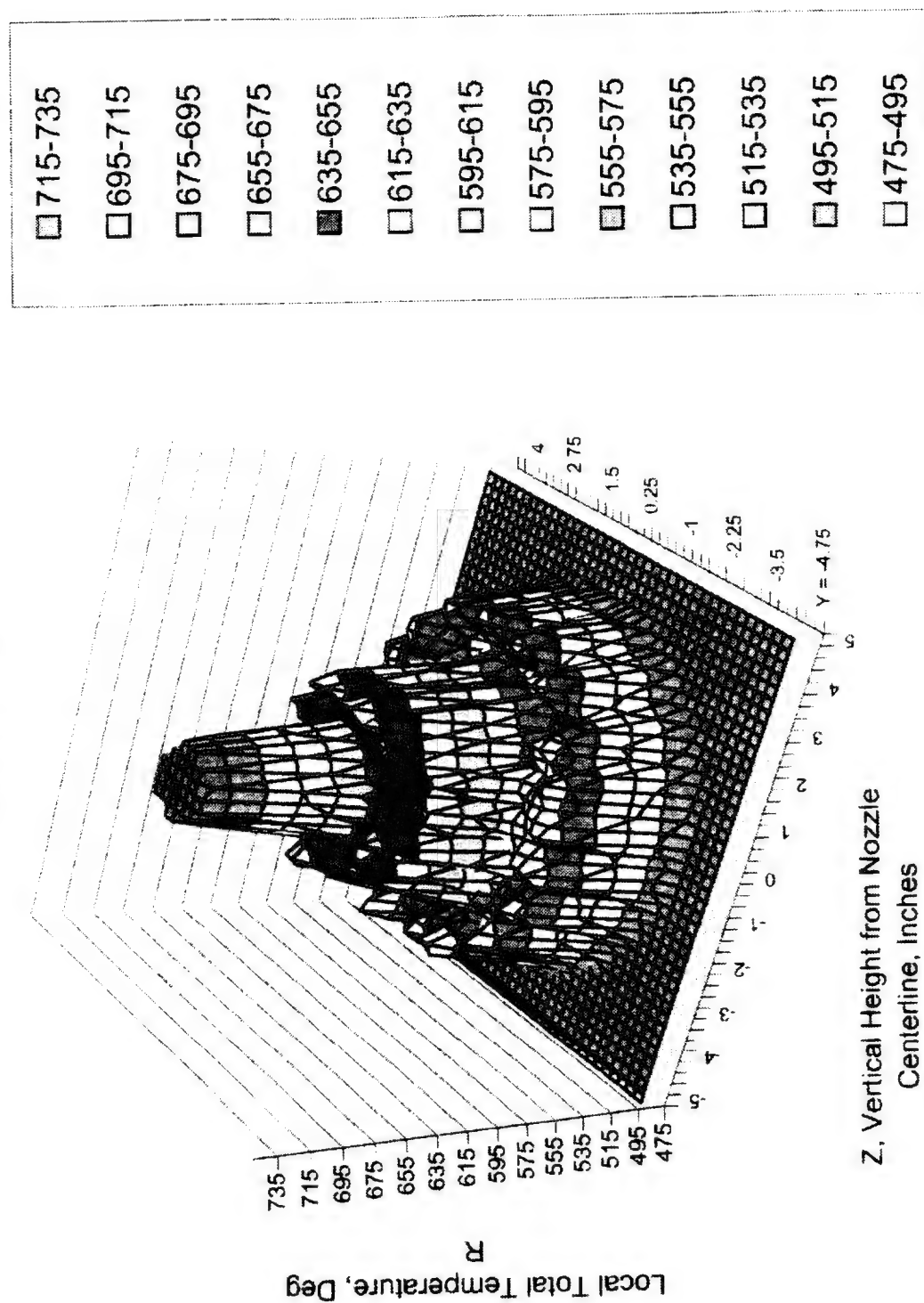




FIGURE 64 (b)

20L Deep Mixer, Total Temperature Survey at  $x/D=0.2$ , 1.54 NPR)core, 1.61 NPR)fan,  
2.62Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT560

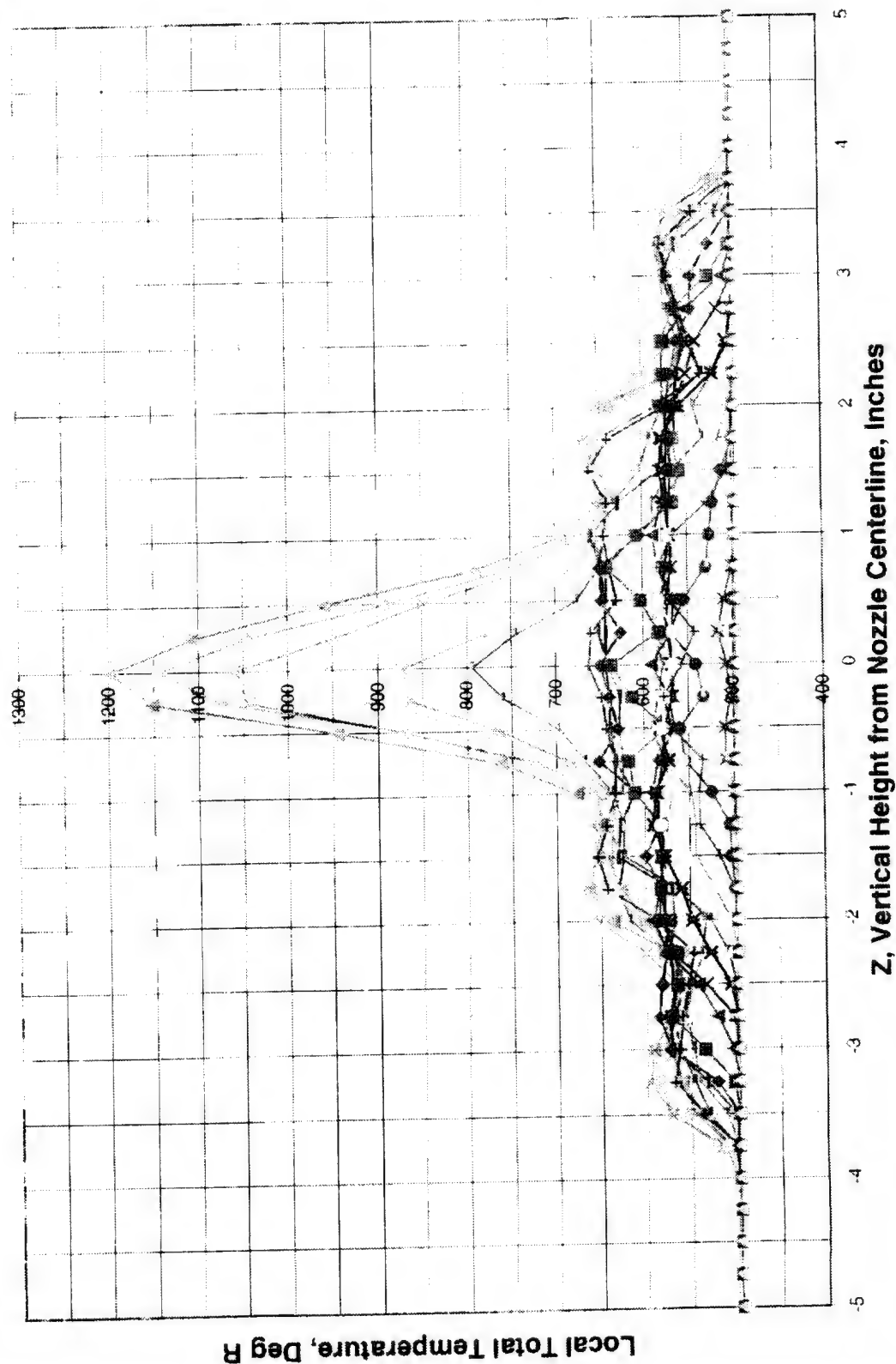




FIGURE 65

Internal Tongue Mixer - Tt survey at  $x/D=0.2$ , NPR(core)=1.54, NPR(fan)=1.61, Mn)FS=0.2, NASA-  
LeRC 1996 Acoustic Mixer/Plume Tests, Rdg # TT510

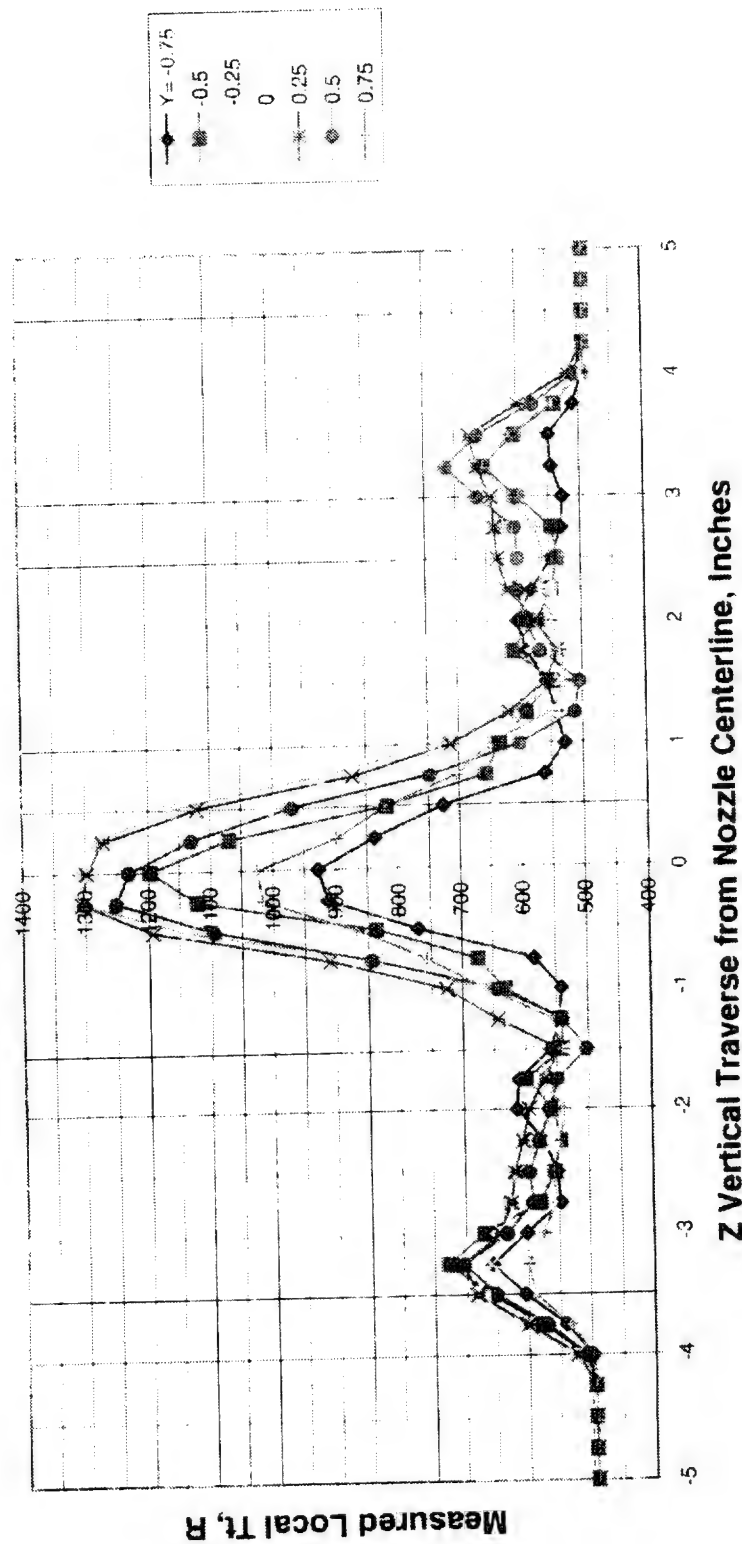




Figure 66(a). 20L Deep Mixer (20DH), Total Temperature Survey at  $x/D=0.2$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT560 [Max.  $T_t=1230.4$  degR]

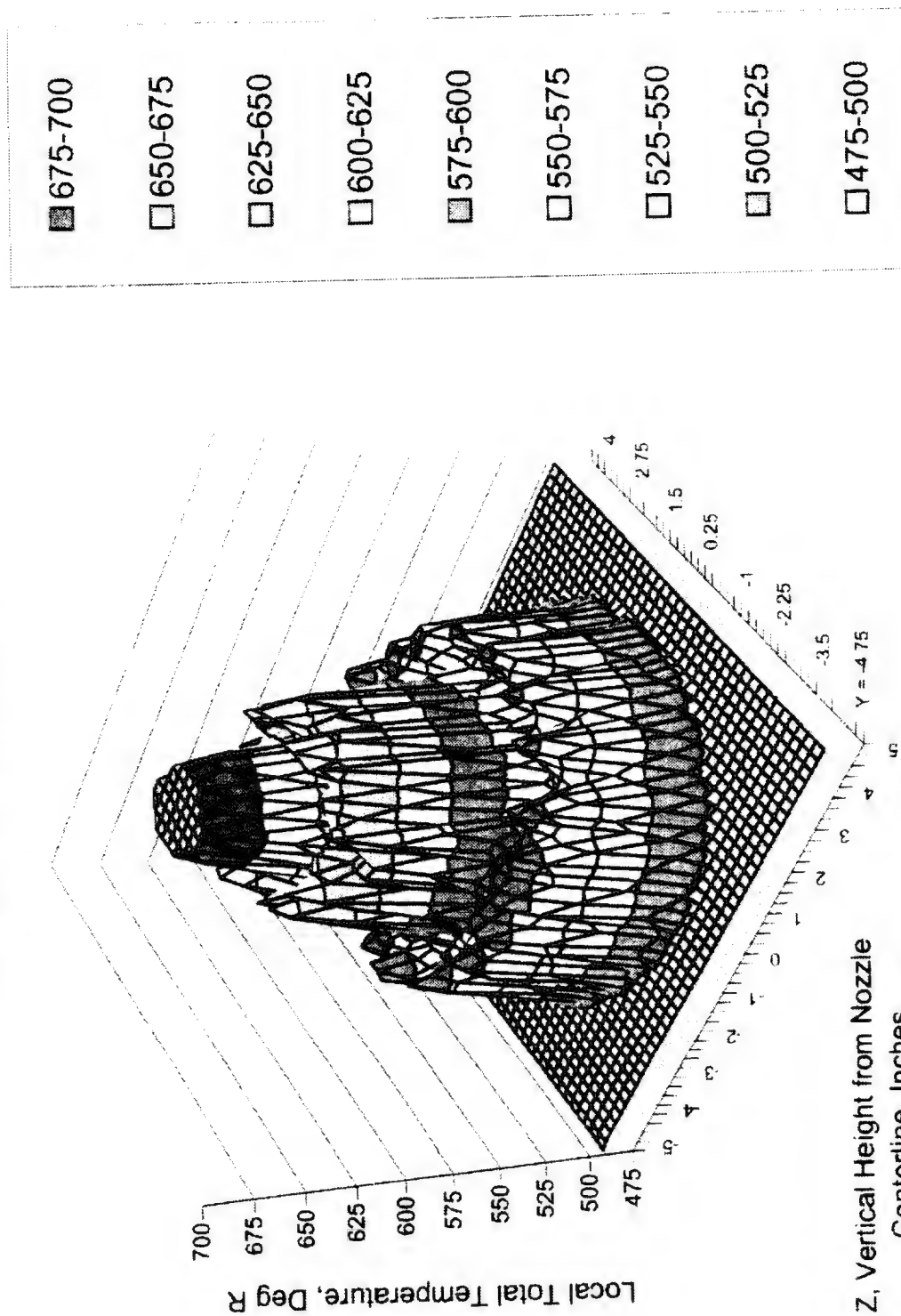




FIGURE 66(b)

20L Deep Mixer, Total Temperature Survey at  $x/D=0.2$ , 1.54 NPR)core, 1.61 NPR)fan,  
2.62Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT560

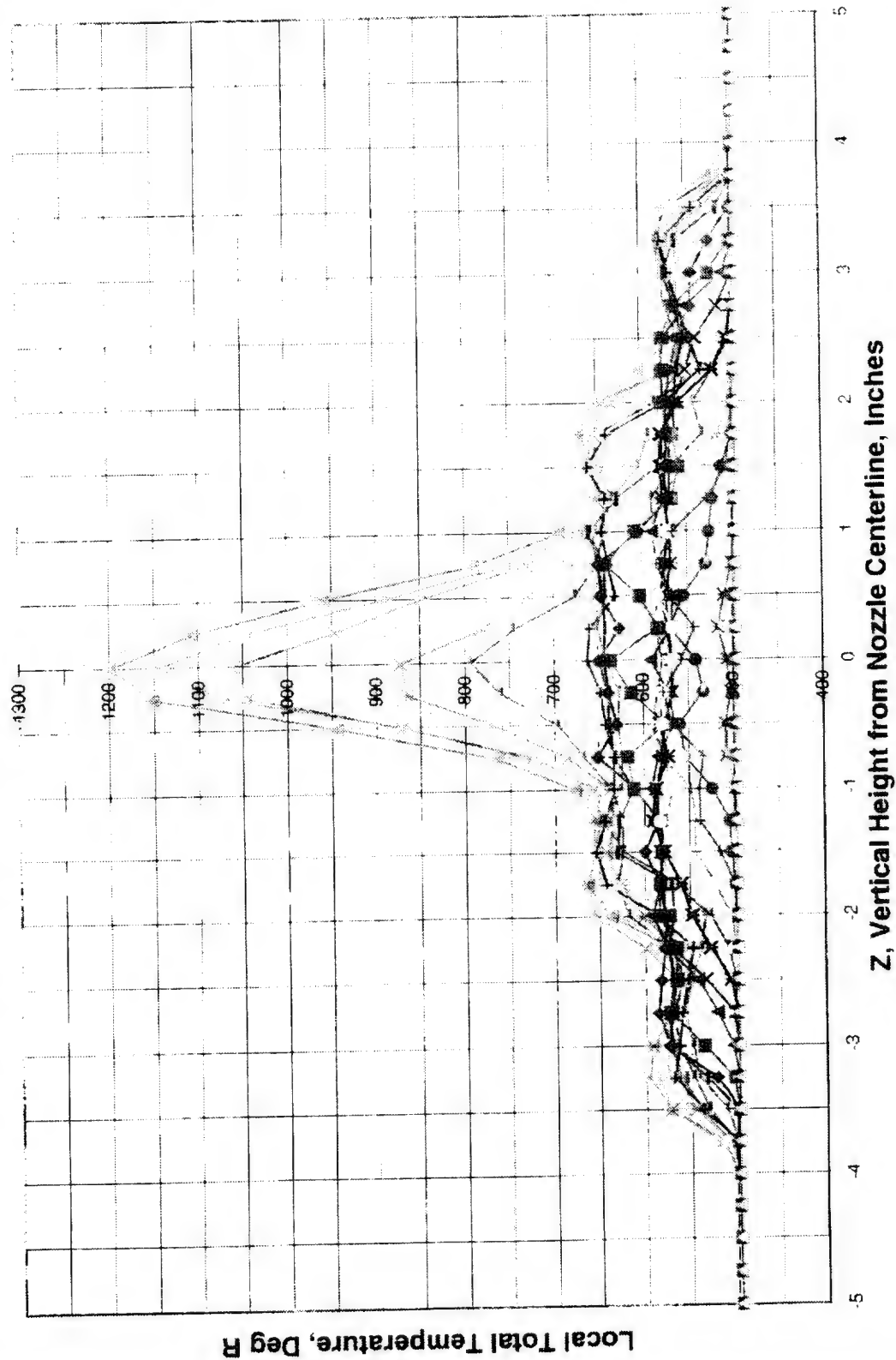




FIGURE 67

20L Deep Mixer, 100% Nozzle Length, Tt Survey at  $x/D=0.5$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT559

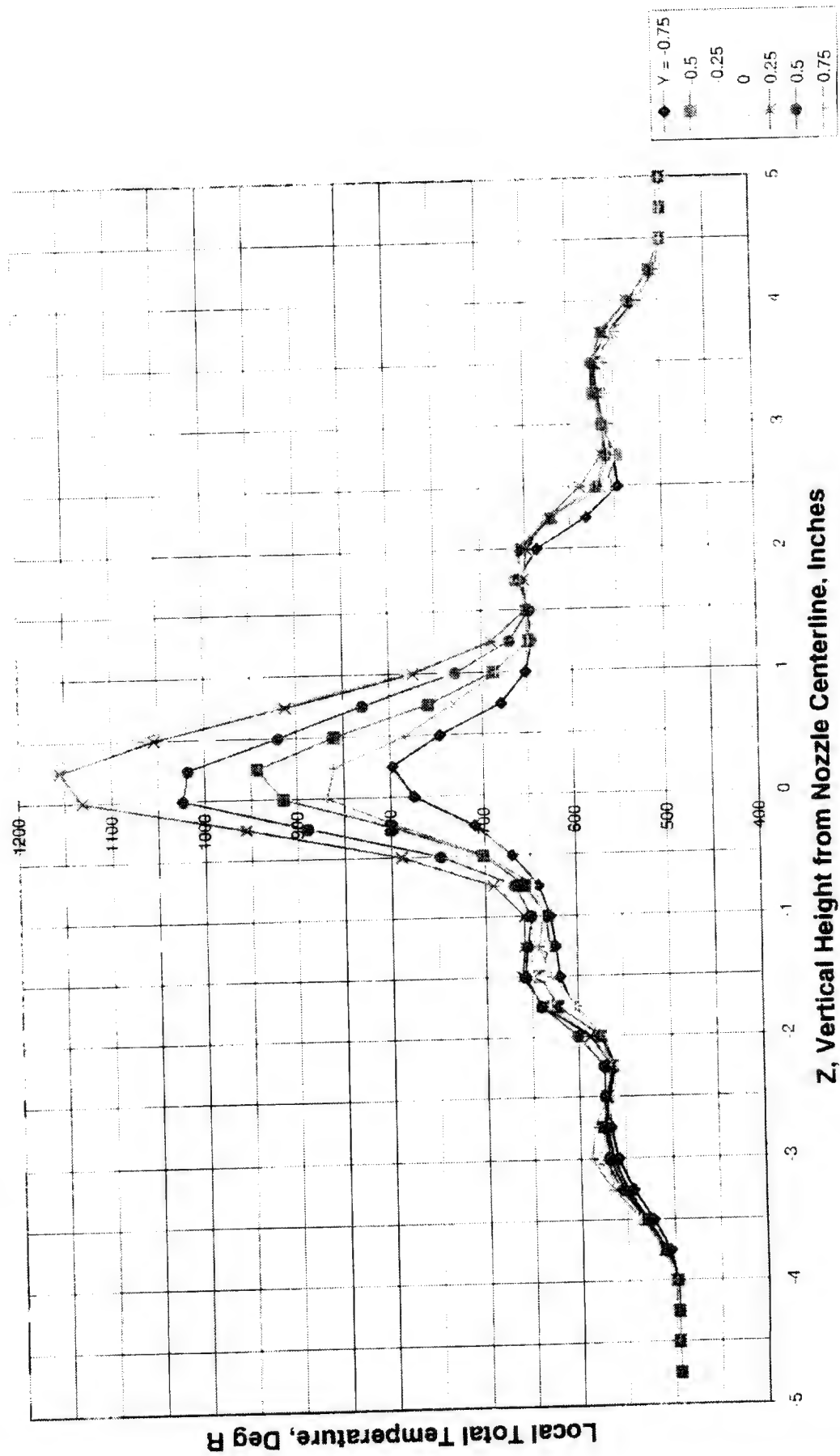




Figure 68(a). 20L Deep Mixer (20DH), 100% Nozzle Length, Tt Survey at  $x/D=1.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT561

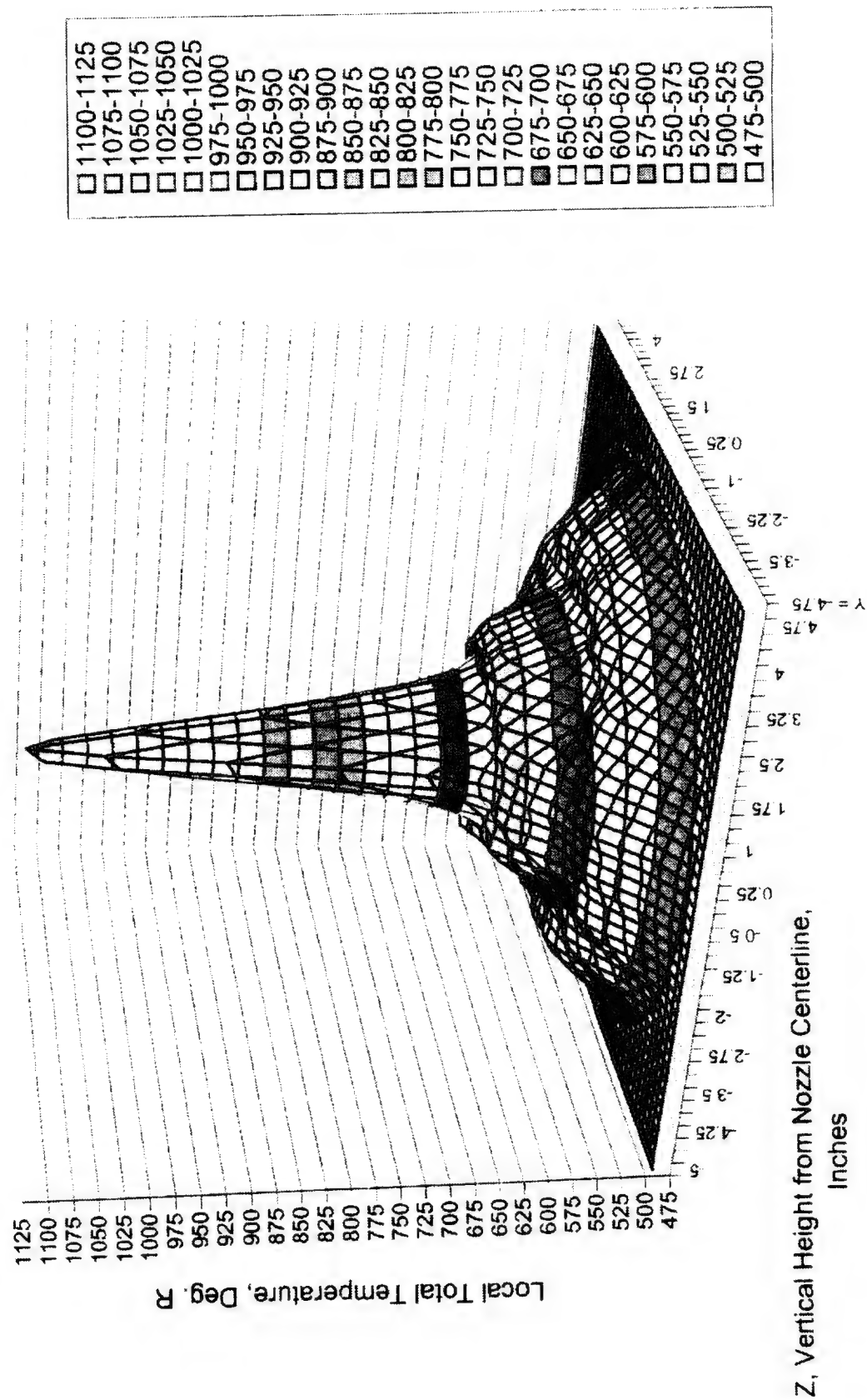




FIGURE 68(b)

20L Deep Mixer, 100% Nozzle Length, Tt Survey at  $x/D=1.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT561

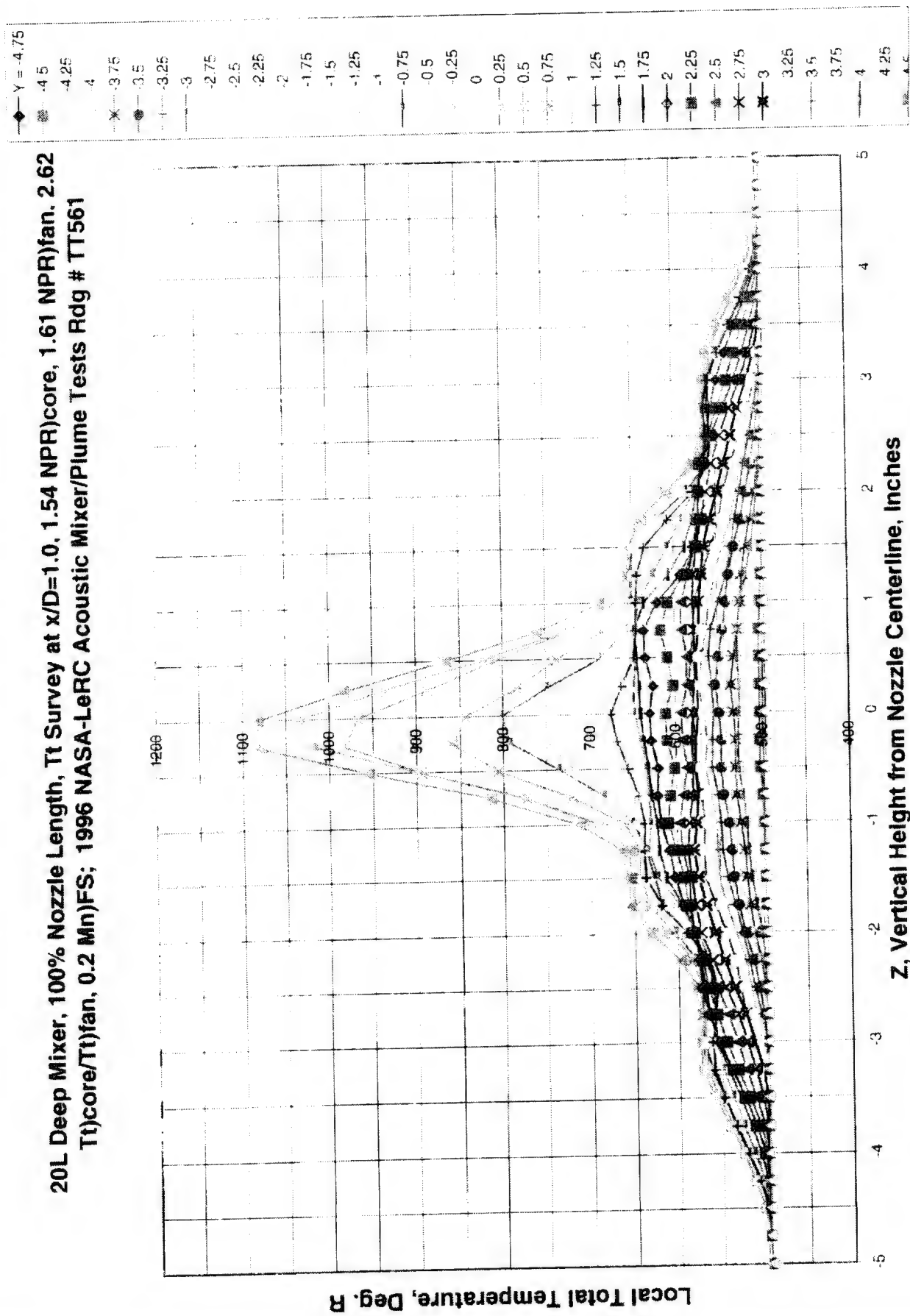




FIGURE 69

20L Deep Mixer, 100% Nozzle Length, Tt Survey at  $x/D=3.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Test Rdg# TT558

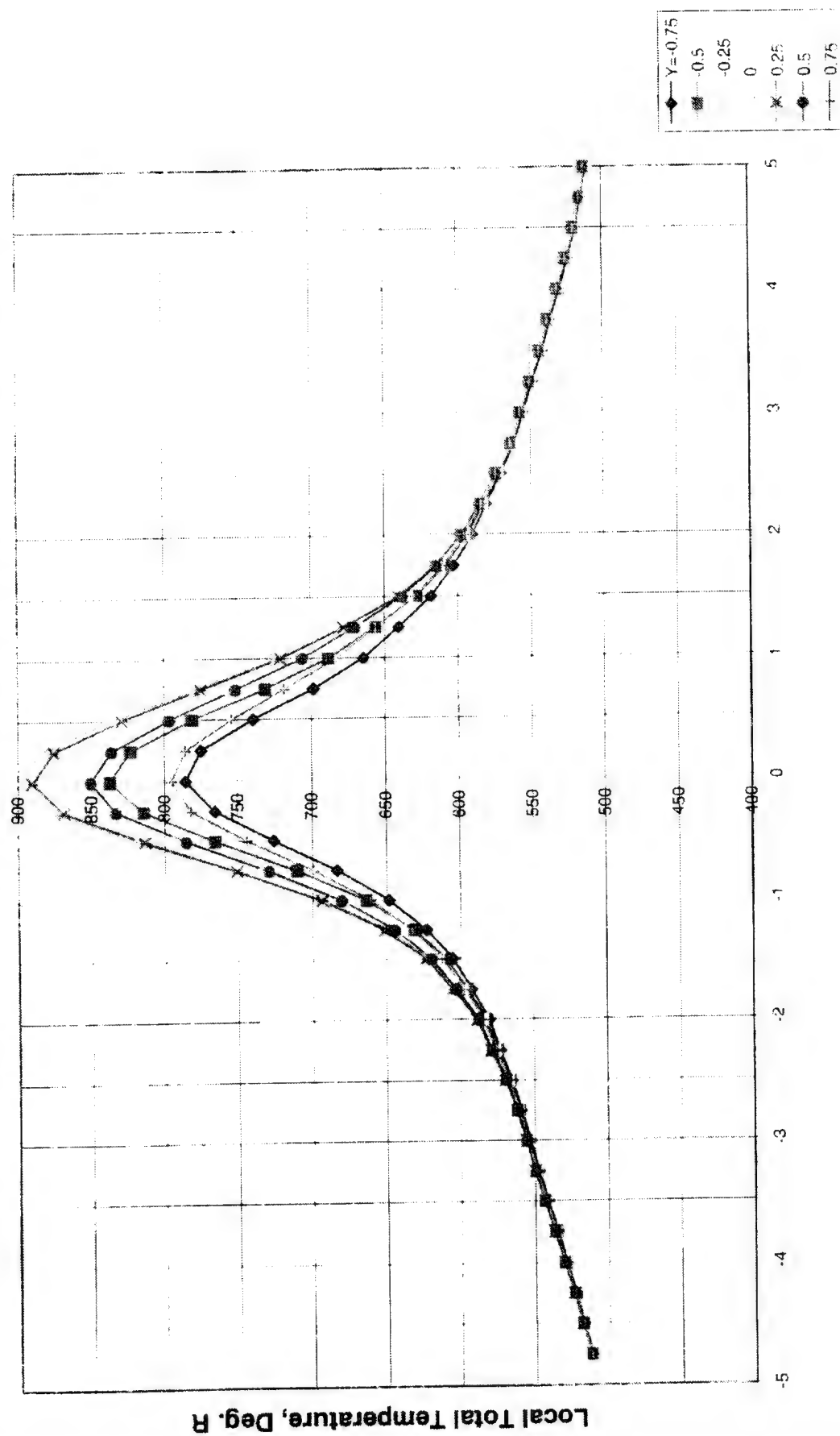




FIGURE 70

20L Deep Mixer, 100% Nozzle Length, Tt Survey at  $x/D=5.0$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT549

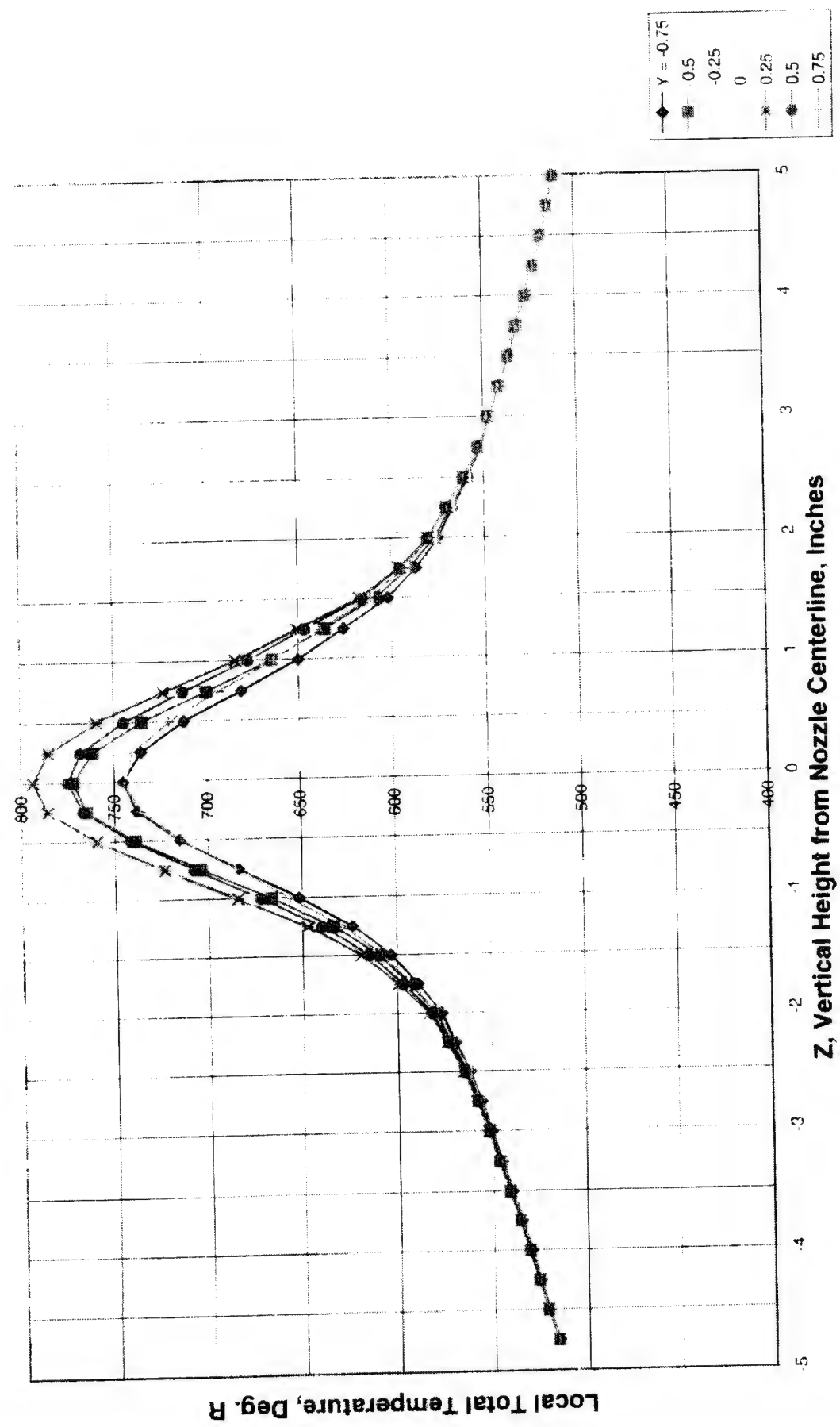




FIGURE 71

20L Deep Mixer, 100% Nozzle Length, Tt Survey at  $x/D=7.5$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT548

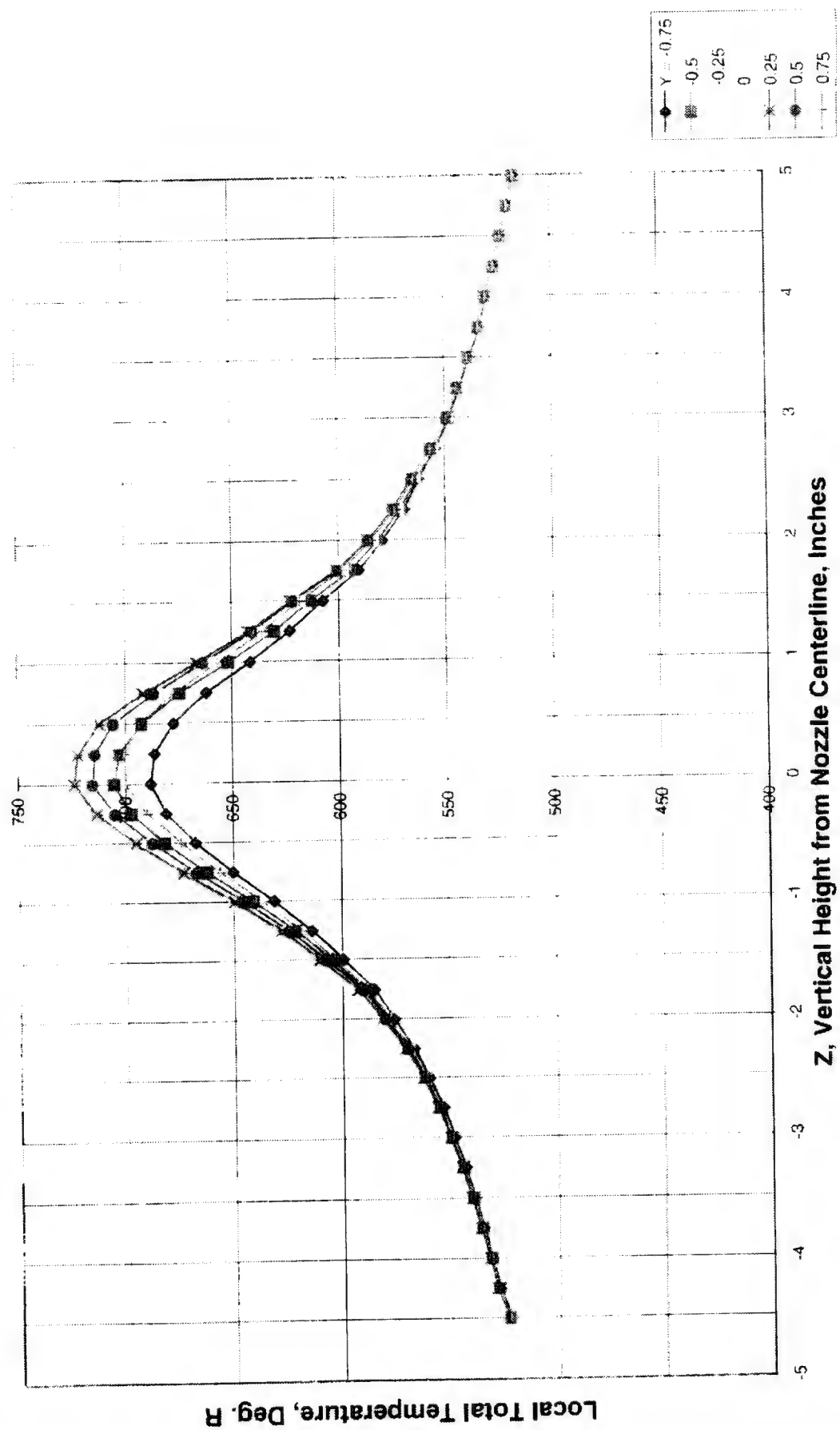
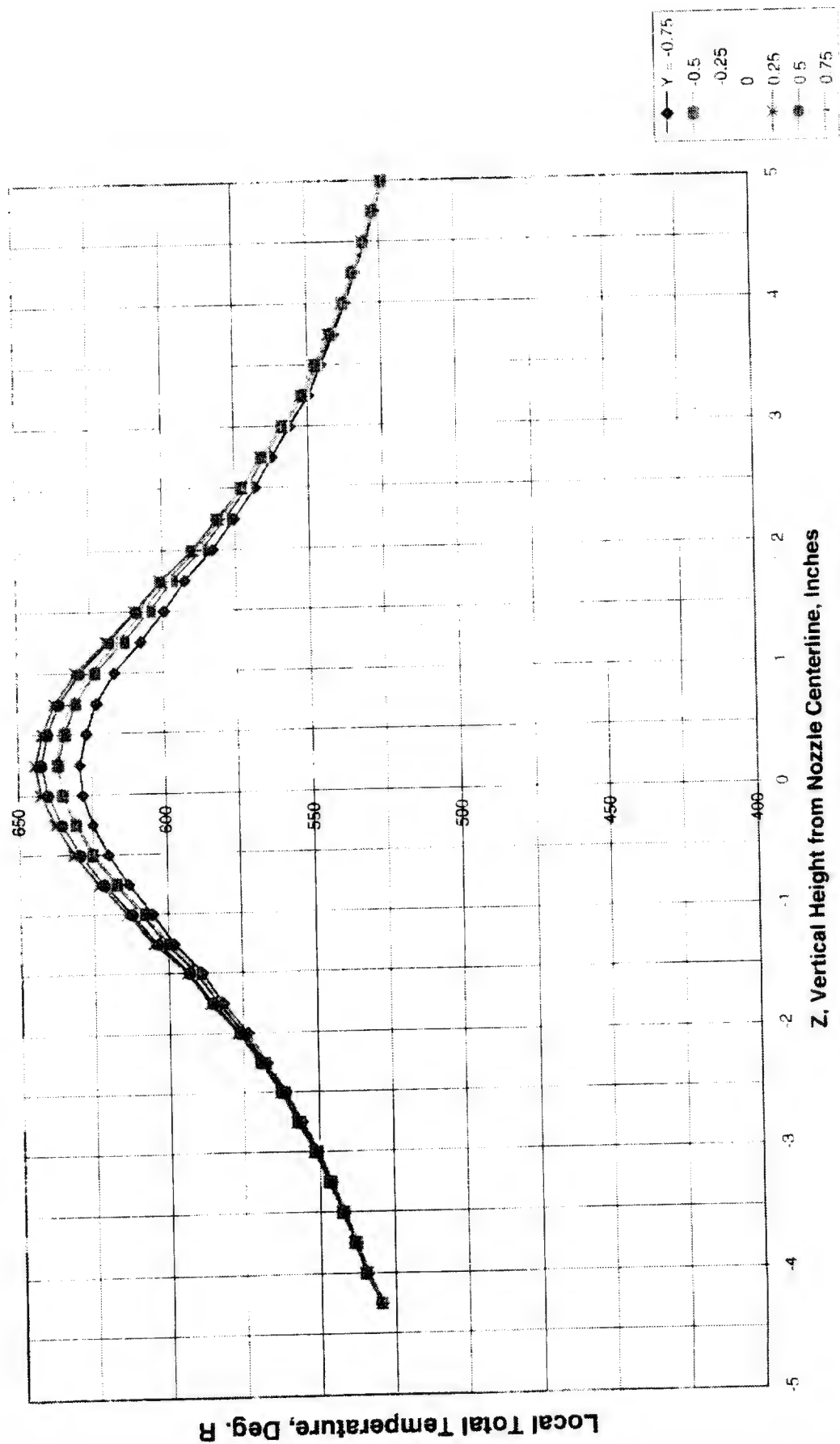




FIGURE 72

20L Deep Mixer, 100% Nozzle Length, Tt Survey at  $x/D=10$ , 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # TT547





**Part 2**  
**Additional Plume Survey Data**

**Von D. Baker**







## SUMMARY

The purpose of this part is to present the second phase of the additional plume data analysis which included: (1) non-dimensional plume total temperature and velocity comparisons, (2) selected total temperature color contour plots, and (3) comparisons of the earlier 1995 mixer plume temperature data with the 1996-97 plume temperature data.

The data, with pertinent comments, are presented in the following order:

1. Non-dimensional total temperature and velocity comparisons
  - 1.1 Maximum "centerline" Tt / ideal mixed Tt for all mixers
  - 1.2 Maximum "centerline" velocity/ideal mixed velocity
  - 1.3 "η" temperature parameter for selected mixers at x/D=0.2
  - 1.4 "η" temperature parameter versus fan NPR at x/D=0.5
2. Total temperature comparisons from 1995 mixer plume tests
2. Total temperature contour plots for selected mixers and test conditions
  - 3.1 Contour plots for selected mixers from 1996-97 plume tests
  - 3.2 Contour plots for selected mixers from 1995 plume tests
4. Conclusions

For the 1995 tests described in section 2.0, the rake assembly consisted of total pressure (Pt) and total temperature (Tt) probes but no static pressure (Ps) probes. Also, the nozzle used in the 1995 tests is the same as that used for the 1996-97 tests. Similarly, the nozzle/mixer test conditions are also described in Part 1 for the 1996-97 tests. The test conditions for the 1995 tests described in section 2.0 are given in Table 1. As in Part 1, to simplify the discussion, the test conditions are hereafter referred to by the core NPR values.

### **1.0 Non-dimensional total temperature and velocity comparisons**

The maximum measured, i.e. "centerline" total temperature was non-dimensionalized by dividing by the  $T_{t \text{ ideal mixed}}$  where, from the energy equation:

$$T_{t \text{ ideal mixed}} = \frac{(m_{\text{core}} * c_p * T_{t \text{ core}}) + (m_{\text{fan}} * c_p * T_{t \text{ fan}})}{(m_{\text{core}} + m_{\text{fan}}) * c_{p \text{ mixed}}}$$

m = weight flow rate,  $c_p$  = specific heat at constant pressure.

### **1.1 Maximum "centerline" Tt / ideal mixed Tt for all mixers**

Fig. 1 shows the comparison of the maximum total temperature divided by ideal mixed total temperature versus x/D for all of the 1996-97 mixers at the 1.39 NPR core condition. This shows the 20 lobe deep mixer (20DH) to have a low temperature ratio, but, as noted in Part 1, the 20 lobe unscalped mixer (20UH) shows the lowest ratio but it only has data at three x/D values. Note that the ratios for all mixers tend to converge at x/D values near 10 which implies the location in the plume where centerline temperatures approach the ideal



mixed temperature. Fig. 2 shows similar trends for the 20 lobe deep mixer (20DH) for the 1.54 NPR)core condition. Fig. 3 shows a typical cross-section cut of the temperature ratio through the plume at  $x/D=0.2$  for the Internal Tongue Mixer (12TH) which shows the same profile characteristics as reported previously in Part 1, except for being normalized with respect to the ideal mixed velocity.

Fig. 4 shows the same trend as Fig. 1 except for the higher operating condition of 1.74 NPR)core which causes the peak temperature ratio levels to be higher than shown in Fig. 1. Note that the temperature ratio for all mixers again approaches 1 near  $x/D$  of 10.

Fig. 5 illustrates schematically that the ideal mixed temperature is not the final equilibrium temperature for the plume. While the data shows that the ideal mixed temperature is reached at an  $x/D$  value approaching 10, the plume temperature must eventually reach the free stream ambient sink temperature to reach thermal equilibrium. While no plume temperature data was taken beyond  $x/D$  of 10, it is assumed that the plume temperature would exponentially decay to the sink temperature in a manner similar to that shown in Fig. 5, although the slope of the extrapolation may be flatter than shown.

## 1.2 Maximum "centerline" velocity / ideal mixed velocity

Turning now to the non-dimensional maximum "centerline" velocity comparisons, an ideal mixed velocity was defined as follows:

1. Calculate the mass flow rate averaged mixed NPR:

$$NPR_{mixed} = \frac{(m * NPR)_{core} + (m * NPR)_{fan}}{(m_{core} + m_{fan})}$$

2. Calculate isentropic velocity function from NPR) mixed and gamma)mixed, and calculated ideal mixed velocity using previously calculated  $T_t$ )mixed:

$$NPR_{mixed} \Rightarrow V_{ideal} / \sqrt{T_{t-mixed}}$$

$$V_{ideal} = V_{ideal} / \sqrt{T_{t-mixed}} * \sqrt{T_{t-mixed}}$$

where  $V_{ideal}$  is defined as the ideal "mixed" velocity.

It is noted that other definitions of "ideal mixed" velocity could be defined. For example, the ideal unmixed velocity of each stream can be calculated separately and then mass averaged to obtain a "mixed" ideal velocity. Another approach would be to calculate  $m\sqrt{T_t} / (P_s A_{eff})$  for the mixed stream at the nozzle exit plane to obtain the velocity function which is then converted to ideal mixed velocity using the ideal mixed temperature as per above step 2. The "ideal mixed" velocity calculation method selected, while not claiming to be rigorous, is felt to be adequate for relative comparisons.

Figs. 6 and 7 show the measured maximum velocity divided by ideal mixed velocity for the 20 lobe deep mixer (20DH) and 12 lobe mixer with cutouts (12CL) at the 1.54 and 1.74 NPR)core operating conditions respectively. A characteristic decay similar to the non-dimensional  $T_t$  decay discussed previously is noted. The 20 lobe deep mixer (20DH) shows lower values compared to the 12 lobe mixer with cutouts (12CL), but, again the two mixers tend to converge near  $x/D$  values approaching 10. The curves tend to cross the ideal velocity (scale reading of 1.00) at  $x/D$  values of around 8.0, as



opposed to the previous temperature comparisons showing ideal mixed temperature levels being attained near  $x/D$  of 10.0

### 1.3 “ $\eta$ ” temperature parameter for selected mixers at $x/D=0.2$

The non-dimensional total temperature parameter,  $\eta$ , is defined as:

$$\eta = \frac{(T_{t-\text{measured}} - T_{t-\text{fan}})}{(T_{t-\text{core}} - T_{t-\text{fan}})}$$

$\eta$  is thus seen to vary between 0.0 and 1.0 since the measured  $T_t$  will either be equal to or greater than the fan  $T_t$  or equal to or less than the core  $T_t$ . This parameter is used by ASE FluidDyne as a non-dimensionalizing temperature “tracing” parameter in correlating data from dual flow model tests involving mixers, thrust-reversers, etc, to full-scale conditions.

If, for a given configuration,  $\eta$  is known from a model test, a corresponding full-scale “measured” temperature can be solved for by substituting into the  $\eta$  equation the corresponding full-scale core and fan  $T_t$  values provided the full scale unit is operated at the same NPR and BPR values as the model. Thus,  $\eta$ -correlations are of interest for applications of the test mixers to other operating conditions. It should be noted that for the 1996-97 NASA plume data shown here, the temperature data was obtained with an external free stream flow simulation of 0.2 Mach number. Thus any application of the  $\eta$  values to other mixer flow conditions would implicitly include this free stream simulation. The 0.2 Mach number external flow effect on plume decay does not appear to be highly significant in the near-field plume for  $x/D$  values up to

10.0 except locally along the outer plume mixing boundary.

Figs. 8 through 10 show the  $\eta$  distributions for the mixer with cutouts (12CL), at 100% and 50% nozzle length, and the internal tongue mixer (12TH) at the maximum test condition of  $\text{NPR}_{\text{core}} = 1.74$  at  $x/D = 0.2$ . The 20 lobe deep mixer (20DH) was not tested at this condition at  $x/D = 0.2$ , but was tested at  $x/D = 0.5$  as shown in Fig. 11. Previous comparisons of the  $T_t$  distributions from Part 1 do not show significant  $T_t$  decay between  $x/D$  of 0.2 and 0.5; thus, including Fig 11 with the other data comparisons at  $x/D$  of 0.2 is probably valid. In general, the  $\eta$  distributions reflect the same trends exhibited by the  $T_t$  distributions reported earlier in Part 1. This includes a rapid center spike, indicating temperatures approaching the core temperature near the centerline of the mixer, with an outer symmetrical “valley” profile followed by smaller “peaks”. The mixer with cutouts (Figs. 8 and 9) exhibiting the highest amplitude from “valley” to “peak”, followed by the internal tongue mixer (Fig. 10). The outer peaks and valleys were significantly reduced in amplitude for the 20 lobe deep mixer (20DH) (Fig. 11), again reflecting the previous  $T_t$  trends.

Fig. 12 shows a completely non-dimensionalized  $\eta$  plot for the internal tongue mixer where both the Z and Y dimensions have been normalized by the nozzle diameter, D. Although the  $\eta$  values in Fig. 12 are for  $\text{NPR}_{\text{core}} = 1.54$ , the distribution trends are very similar to those shown in Fig. 10 for  $\text{NPR}_{\text{core}} = 1.74$ .

Figs. 13 and 14 show  $\eta$  distributions at the  $\text{NPR}_{\text{core}} = 1.39$  condition for the 20 lobe deep scalloped mixer (20DH) and 20 lobe unscalloped mixer (20UH) at  $x/D=0.2$ . Note that the unscalloped mixer, 20UH, (Fig. 14)



shows a slightly lower  $\eta$  value (lower measured  $T_t$ ) at the centerline, as discussed earlier, compared to the 20 lobe deep scalloped mixer (20DH) (Fig. 14); however, note also that the  $\eta$  distributions in the annular areas where the mixers are located show less mixing occurring for the unscalped mixer (20UH) (more outer peak amplitude) compared to the deep scalloped mixer (20DH).

Comparing Figs. 13 and 14, by inspection it would appear that an integrated average  $\eta$  value (area under the curve) for the deep scalloped mixer (Fig. 13) would be less than the corresponding average  $\eta$  for the unscalped mixer (Fig. 14). If true, then the 20 lobe deep mixer (20DH) would exhibit greater mixing for all "outer" annular zones ( $Z$  values greater than  $\pm 1.0$  inch) except near the centerline of the mixer.

While the deeply scalloped mixer (20DH) is intuitively believed to have better mixing capability than the unscalped mixer (20UH), a presumption which is also suggested by the  $\eta$  comparisons in the outer zones of the plume, the reason for 20DH mixer's slightly higher maximum centerline  $\eta$  (and  $T_t$ ) values is not immediately obvious.

It should also be noted that the small negative  $\eta$  values shown on the above figures is the result of temperature survey measurements extending outside the plume and into the external free stream which has a measured  $T_t$  value slightly lower than the fan stream  $T_t$ . The cross-over between negative and positive  $\eta$  values is thus indicative of the approximate location of the plume outer boundary.

#### 1.4 " $\eta$ " temperature parameter versus fan NPR at $x/D = 0.5$

Fig. 15 compares the effect of the fan NPR on the maximum centerline  $\eta$  value at  $x/D=0.5$  for the 20 lobe deep mixer (20DH), internal tongue mixer (12TH) and 12 lobe mixer with cutouts (12CL)s. Note that the core NPR and  $T_t$ (core/ $T_t$ )fan ratios are also changing according to the scheduled test values as the fan NPR changes. Thus, the  $\eta$  values plotted reflect the combined effect of all three flow variables changing simultaneously along a scheduled characteristic to simulate the engine thrust variation as described in Part 1, page 3. If the fan and core NPR values had been held constant, and only the  $T_t$  ratio varied, the  $\eta$  values would have been expected to be essentially constant in keeping with the non-dimensional characteristic of the  $\eta$  parameter.

In terms of maximum  $\eta$  levels, Fig. 15 basically reflects the same trends seen previously in the  $T_t$  plots, i.e., the 12 lobe mixer with cutouts (12CL) has the highest  $\eta$  values, the 20 lobe deep the lowest, and the tongue mixer being slightly lower than the 12 lobe mixer with cutouts (12CL).

#### 2. Total temperature comparisons from 1995 mixer tests

During September, 1995 tests were conducted at NASA-Lewis to measure plume  $P_t$  and  $T_t$  data, and velocity (from LDV measurements), for the four mixers listed in Table II. Only the total temperature data was examined and reported below.

The 1995 tests used the same 100% length nozzle with 7.250 inch exit throat diameter as used in the 1996-97 plume testing. Only one set of flow condition was tested for the 1995 tests as given in Table I, which is the



same as the "Cycle F" conditions tested in 1996-97 except for the free stream Mach number values of 0.1 and 0.3. compared to 0.0 and 0.2 for the 1996-97 tests.

The 1996-97 Plume tests included the five mixers listed in Table II of Part 1. The 1995 Plume tests included four mixers as listed in Table II below.

The 1995 plume tests were of limited scope compared to the 1996-97 tests, and do not contain as complete a database. For example, the plume was only surveyed to an  $x/D$  value of 4.0 which is basically just outside the potential core region. Thus essentially no significant data were obtained to define the plume decay characteristics. Also, there appears to be an alignment problem between the nozzle centerline and the corresponding center origin of the Tt measurements which is obvious when viewing the  $x/D$  profiles which are off-set approximately 1 to 1.5 inches from the center of the measured Tt array.

Still the maximum Tt values were recorded, however, which minimizes the effect of this. Also, the Z dimension was not referenced from the nozzle centerline, but from the end of the Tt rake. This orientation is shown on each of the Tt plots presented below. The Y values are defined the same as in the Part 1 data, i.e., the horizontal distance from the center of the array, which, as note above, may not be in alignment with the nozzle centerline. While this rake misalignment is unfortunate and frustrating, it is still possible to get a reasonable recording of the Tt profiles at each Y value except near the right edge of the plots where the data is cut off.

Figs 16 through 20 show Tt profiles for the confluent mixer at  $x/D$  values of 0.1, 0.5, 1.0, and 4.0. As expected, these profiles show a basically symmetrical "pipe flow"

profile for the hot core region dropping off to the cold fan Tt levels in the outer annulus areas. These profiles are, of course, significantly different than the typical lobe mixer profiles that are shown in Part 1. Fig 19 shows the Tt profile at  $x/D$  of 4.0, which has become more parabolic and symmetrical. Fig 20 is the same condition but a re-peat point which shows good repeatability in the data.

Figs. 21 through 24 show Tt profiles at the same conditions as above for the 12 lobe mixer with cutouts (12CL). The profiles are similar from  $x/D$  of 0.1 to 1.0 exhibiting the high temperature center spike superimposed on the lower temperature peaks and valleys near the mixer as seen earlier in Part 1. At  $x/D$  of 4.0, fig. 24, note the similarity in profile parabolic shape with the data in fig. 20 for the confluent mixer, but note that the former has a significantly lower maximum centerline Tt and a flatter parabolic shape due to the mixing enhancement from the lobes.

The mixer with cutouts from the 1995 plume testing was also re-tested during the 1996-97 plume testing. The repeatability of this re-testing is compared at  $x/D=0.5$  in Fig. 22 for the 1995 test and in Fig. 25 for the 1996-97 test. The free stream Mach number was 0.3 for the 1995 test data in Fig. 22, and 0.2 for the 1996-97 data in Fig. 25. Also, of course, the Z dimension to the Tt probe is referenced differently in the two tests as mentioned earlier which means the data in Fig. 22 is not centered correctly relative to the nozzle centerline. However, comparing the two sets of data it is noted that the peak centerline Tt values are approximately 1210 °R for the 1995 test and 1171 °R for the 1996-97 tests. The ambient Tt was approximately 46 degrees hotter for the 1995 tests, but the free stream Mach number was 0.1 higher. Both differences may have



some influence on the max. temperature differences. The  $T_t$  profiles appear to be similar in both tests in regard to the outer peaks but some differences are noted in the outer valleys, and at other off-center  $Y$  values, that are not immediately understood and are noted here for future reference.

Figures 26 through 29 show  $T_t$  profiles for the 12 lobe unscalped mixer (12UH) at  $x/D$  values of 0.1, 0.5, 1.0, and 4.0. Similar trends as noted above for the 12 lobe baseline (12CL) are also seen for the 12 lobe unscalped mixer (12UH) for  $x/D$  values up to 1.0 except that 12UH shows lower maximum  $T_t$  values. A more significant profile difference was noted at  $x/D$  of 4.0, comparing Fig. 24 with Fig. 29, wherein the 12 lobe unscalped mixer (12UH) shows a convex or "bowed" out profile for  $Z$  distances outside the central high temperature spike and the 12 baseline shows the concave or parabolic profile in the same region. Also a nonsymmetrical "dip" in the left side of the 12 lobe unscalped profile, in Fig. 29, where the center spike region begins to develop appears to be a local anomaly in the data.

Figures 31 through 33 show  $T_t$  profiles for the 16 lobe unscalped mixer at  $x/D$  values of 0.1, 0.5, 1.0, and 4.0. The data shows the usual center peak as seen in the other lobe mixers but at a lower  $T_t$  maximum value than the 12 lobe baseline or 12 lobe unscalped mixer (12UH). A more complex peak and valley profile sub-structure is noted, presumably due to the increased number of lobes, for  $x/D$  values up to 1.0. However, at the  $x/D$  value of 4.0, Fig. 33, the profile has a similarity to the convex profile noted for the 12 lobe unscalped mixer (12UH), Fig. 29.

Figure 34 summarizes the maximum "centerline"  $T_t$  decay for the 1995 NASA

test mixers for  $x/D$  values up to the maximum tested of 4.0. The significant  $T_t$  reduction provided by the lobe "forced" mixers over the confluent "free" mixer is apparent from Fig. 34. The 16 lobe unscalped mixer (16UH) had the lowest maximum  $T_t$  values being significantly lower than the 12 lobe mixer with cutouts (12CL). The corresponding  $T_t$  decay for the 12 lobe unscalped mixer (12UH) was about midway between the 12 lobe baseline mixer with cutouts (12CL) and 16 lobe unscalped mixers. For comparison, the corresponding data for the 1996-97 NASA LeRC tests are shown in Fig. 1 of Part 1.

## **2.0 Total temperature contour plots for selected mixers and test conditions**

The X-Y total temperature data grid for selected mixers and test conditions was converted to an R-theta polar grid by processing the NASA data using the Field View program. Some interpolation of the data field is required, which is done by Field View, to fill in the required polar coordinates from the rectangular coordinates. The results of this conversion are contour plots of total temperature taken in a perpendicular "slice" across the plume as viewed looking downstream in the direction of flow. The temperature contours on these plots are thus more easily identifiable with the corresponding mixer lobe geometry. It should also be noted that the contour plots are presented in degrees F whereas all other plume temperature plots in this report are in degrees R.

### **3.1 Contour plots for selected mixers from 1996-97 plume tests**

Figs 35 through 41 show total temperature contour plots for the 1996-97 NASA test mixers. Figs 35 through 37 show the data for the "full" survey taken at  $x/D=0.2$  at the



1.74 NPR)core condition for the 12 lobe baseline (12CL) with 100% length nozzle, 12 lobe baseline (12CL) with 50% length nozzle, and the internal tongue mixer (12TH). Also superimposed on the contour plot is the nozzle exit diameter circle of 7.25 inches for reference.

Figs 35 and 36 readily show the spatial orientation of the mixer lobes and the center hot zone near the centerline for the 12 lobe mixer with cutouts (12CL). The temperature variation between the hot and cold side of the lobes, the relative degree of mixing that has occurred in the outer portions of the flow-field, and lack of mixing in the very central portion of the flow-field can be deduced from the temperature contours. Fig 36, for the shorter 50% nozzle length, appears to show more radial higher temperature zones between the lobes suggesting less mixing than that shown for the 100% nozzle length in Fig. 35. Fig. 37 shows similar data for the 12 pair internal tongue mixer (12TH) but indicates the presence of 12 distinct contours from the tongues with somewhat different interior mixing contours.

Figs. 38 through 41 show the same type of contour data for the above mixers, plus the 20 lobe deep scalloped mixer (20DH), taken at  $x/D$  of 0.5. These data were taken for a "center" survey where the Y value was only traversed from -0.75 inches to +0.75 inches as opposed to a "full" survey. While this data is more limited in scope, it shows the same general patterns as noted above. Note that the contour data for the 20 lobe deep scalloped mixer (20DH), shown in Fig. 41, reflects apparent increased mixing by virtue of the coalescing of the discrete contours around the lobes into a more uniform temperature flow-field.

### 3.2 Contour plots for selected mixers from 1995 Plume tests

Figures 42 through 45 show total temperature contour plots for the confluent mixer, 12 lobe baseline mixer (12CL), 12 lobe unscaloped mixer (12UH), and 16 lobe unscaloped mixer (16UH) at the stated NPR)core condition respectively. The annular contours of the confluent mixer, shown in Fig. 42, are seen to be fundamentally less complex, and less mixed, than the typical contours generated by the lobed mixers as expected. Also, the 12 lobe unscaloped mixer (12UH) contours, Fig. 44, are different than those for the 12 lobe mixer with cutouts (12CL), Fig. 43. The 16 lobe unscaloped mixer's (16UH) lobe pattern is reflected in the contours shown in Fig 45 which appears to show more mixing penetration into the peak center area.

### 4.0 Conclusions

1. The 1996-97 AST mixer plume testing has generated a very significant database of plume measurements for several Rolls-Royce Allison mixers. Additional plume data, although more limited in scope, was also obtained for these mixers tested at NASA-LeRC during the first test series in 1995. A small portion of this combined database has been presented in this report, and in Part 1, and other plots of specific interest can be generated as required in the future.

2. The non-dimensional maximum "centerline" total temperature divided by ideal mixed temperature (temperature ratio) plotted versus  $x/D$  axial distance shows the same relative trends that were seen previously as reported in Ref.1. The 20 lobe deep scalloped mixer (20DH) and 20 lobe unscaloped mixer (20UH) show more rapid centerline decay than the 12 lobe baseline



mixer (12CL) or internal tongue mixer (12TH). The temperature ratios for all mixers tend to converge at  $x/D$  values approaching 10 which suggest the axial location where the centerline temperatures approach ideal mixed temperatures. (See figs. 1 and 4)

3. The ideal mixed temperature is not the final thermal equilibrium temperature of the plume which will continue to decrease, beyond  $x/D$  of approximately 10, to the free stream sink temperature. An extrapolation of the maximum centerline decay curve suggests that the ambient temperature level would be reached around  $x/D$  of 30, or higher, depending on the extrapolation used. (See fig. 5)

4. The non-dimensional maximum "centerline" velocity divided by the ideal mixed velocity (velocity ratio) plotted versus  $x/D$  shows a decay characteristic trend that is similar to the temperature ratio decay. It was observed that the velocity ratio plots tend to cross the ideal velocity level at  $x/D$  values near 8.0, whereas the temperature ratio tends to cross the ideal mixed temperature level at  $x/D$  values near 10 (See figs. 6 and 7).

5. The "η" non-dimensional total temperature parameter was generated for several test and mixer conditions. This data may be useful for predicting full scale engine plume temperatures for given fan and core temperatures (See figs. 8 through 15).

6. The 1995 plume data for 12CL, 12UH and 16UH mixers showed relative trends that are similar to those reported earlier for the 1996-97 plume data. As expected, the 1995 data also showed the significant mixing enhancement superiority, as gauged by the maximum "centerline" temperature decay, provided by the lobe mixers over the

confluent mixer. (See fig. 34). The 16 lobe unscalped mixer (16UH) exhibited the lowest maximum "centerline" total temperature levels of all mixers tested at a common comparison point (1.39 NPR core). It is presumed that this trend would also apply at the other test conditions although the data is missing to substantiate this. (See fig. 34 in this report and fig. 61 in Ref.1).

7. The total temperature contour plots are helpful in visualizing the spatial orientation of the individual plumes from the mixer lobes and the center hot zone that was typical for all of the lobe mixers (See figs. 35, 36 and 36). The basically annular temperature contours for the confluent mixer are, by contrast, seen to be fundamentally less complex and less mixed than those for the lobed mixers (See fig. 42).

8. When comparing the maximum centerline temperatures of the plume, the variation in bypass ratio from mixer to mixer should be taken into account. In most cases the variation is small; however, the 16 lobe unscalped mixer (16UH) resulted in a relatively higher BPR compared to the other mixers tested. This mixer would have a larger percentage of cold fan flow, which would have a more diluting effect on the hot plume temperatures in the region of the plume beyond the central hot core. This would in turn tend to reduce the mixed temperature decay based on simple heat balance considerations. Thus the lowest centerline temperatures recorded for the 16 lobe unscalped mixer (16UH) may have been primarily due to the higher BPR dilution effect rather than from superior mixer characteristics from the lobe design.



**Table I Test Conditions for 1995 NASA Mixer Plume Tests**

<b>NPR)core</b>	<b>NPR)fan</b>	<b>Tt)core/Tt)fan</b>	<b>Mach No., M(fj)</b>
1.39	1.44	2.34	0.1 & 0.3

**Table II 1995 Rolls-Royce Allison/NASA Mixers**

<b>Mixer Description</b>	<b>Exhaust Nozzle Length</b>	<b>Comments</b>
12 lobe baseline(*) (12CL)	100%	With lobe sidewall cut-outs
Confluent (CONF)	100%	
12 lobe Advanced (12UH)	100%	No scallops
16 lobe Acoustic (16UH)	100%	No scallops

(\*) The 12 lobe Mixer with cutouts (12CL) was also re-tested during 1996-97 testing



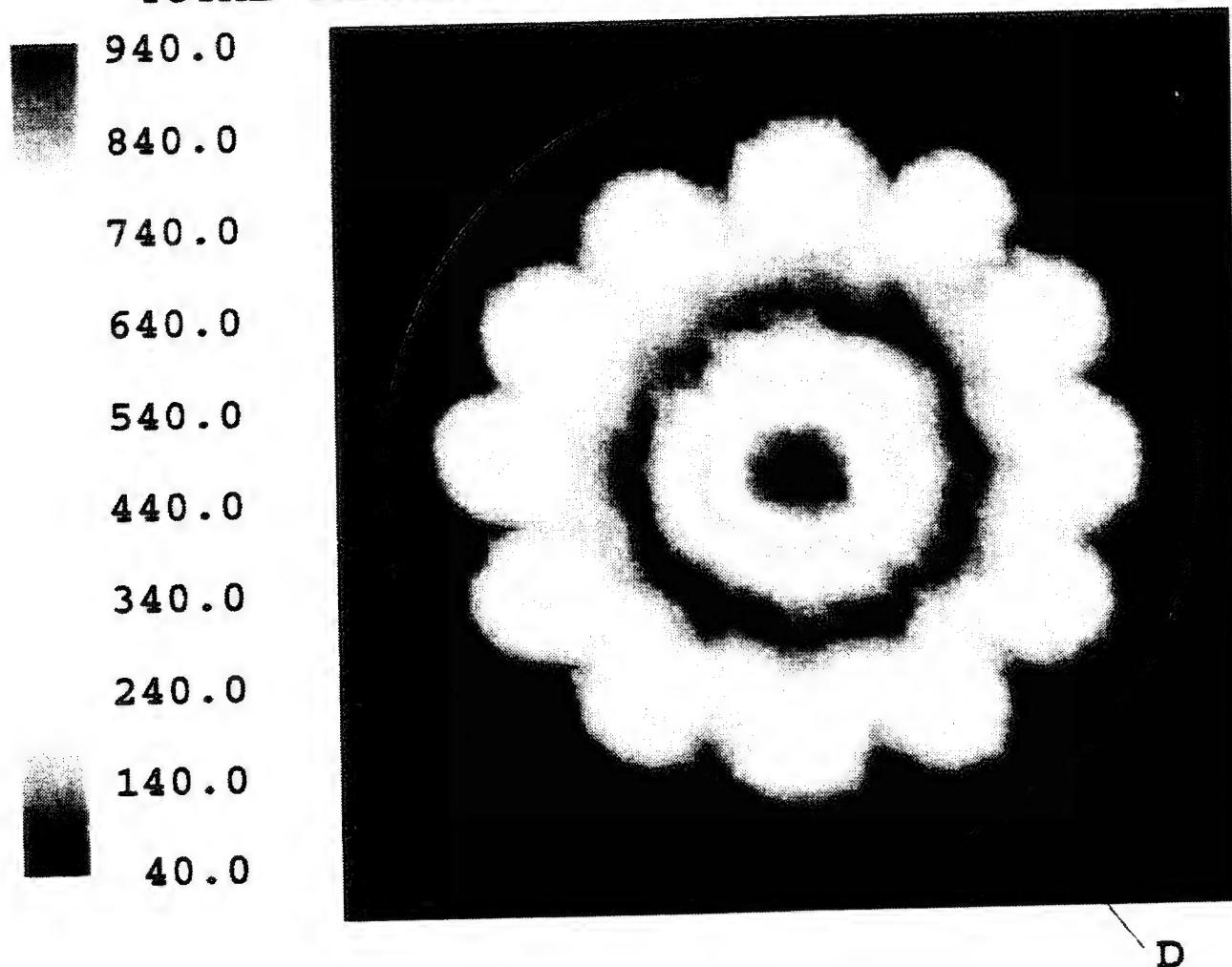




FIGURE 1

12 LOBE BASELINE MIXER-100% NOZZLE LENGTH

TOTAL TEMPERATURE - F AT  $X/D = 0.2$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.74$ ;  $\text{NPRf}=1.82$ ;  $\text{TTC}/\text{TTf}=2.79$ ;  $M=0.2$

1996 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

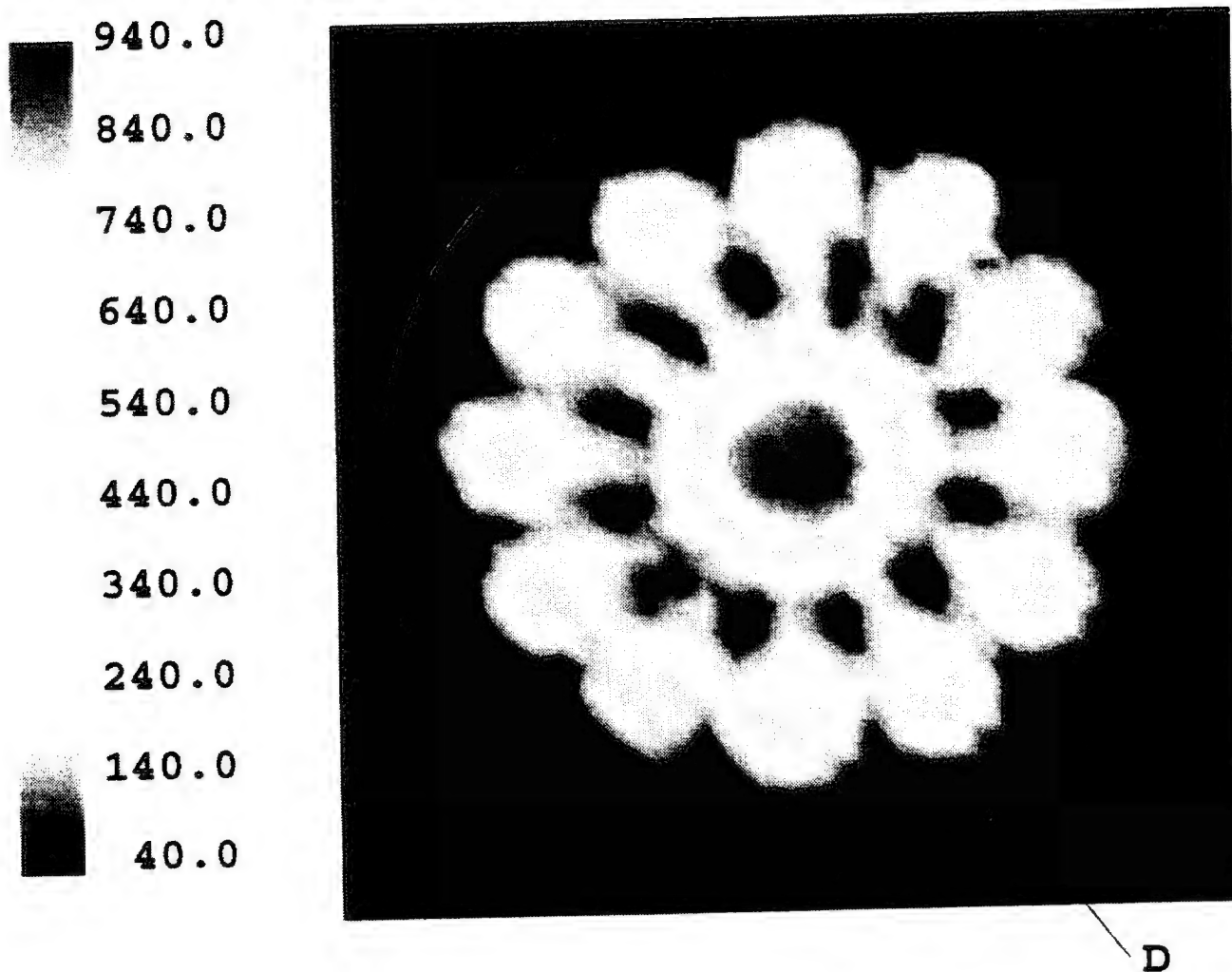
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FIGURE 2

12 LOBE BASELINE MIXER-50% NOZZLE LENGTH

TOTAL TEMPERATURE - F AT  $X/D = 0.2$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.74$ ;  $\text{NPRf}=1.82$ ;  $\text{TTC}/\text{TTf}=2.79$ ;  $M=0.2$

1996 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

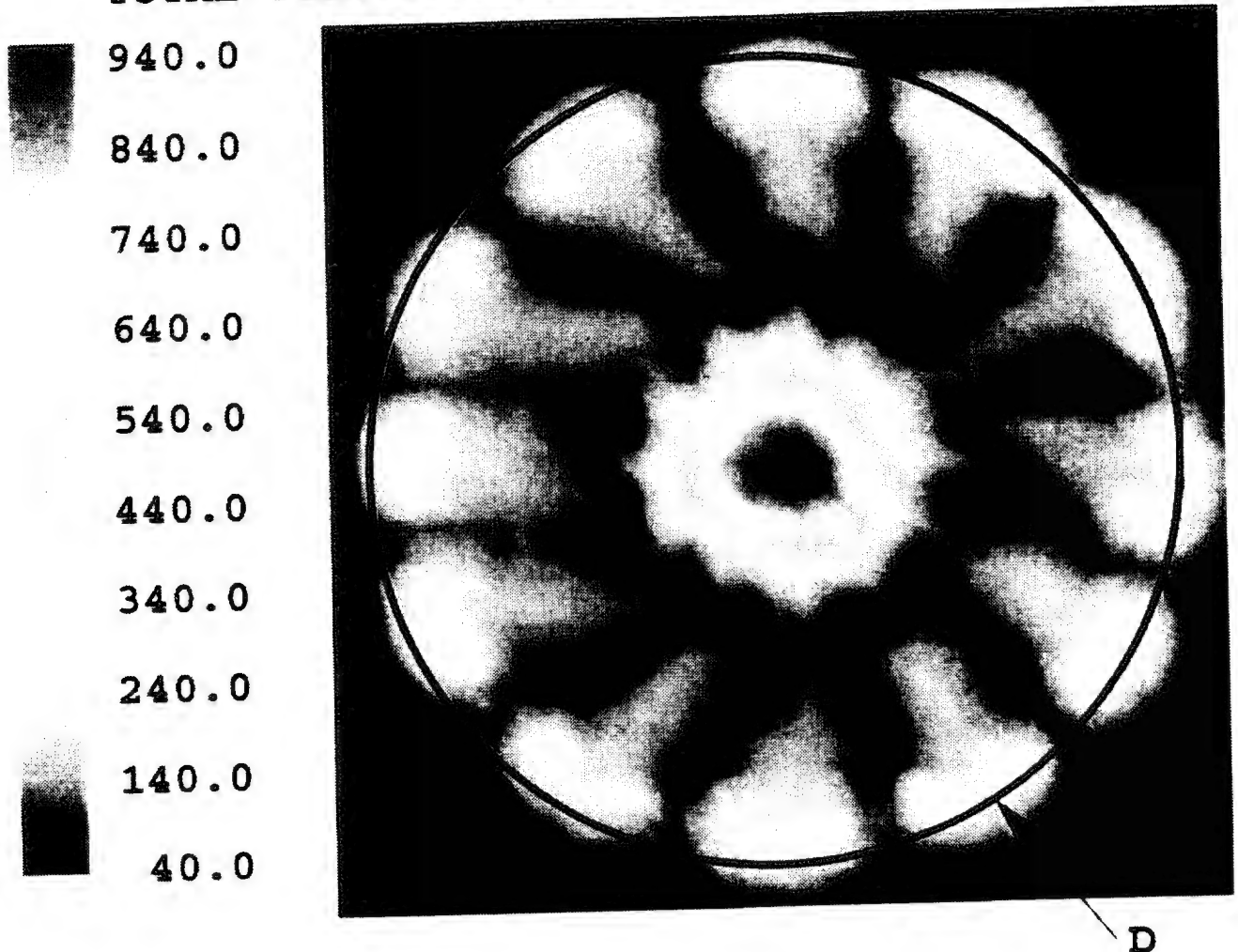
READING NUMBER T597



FIGURE 3

INTERNAL TONGUE MIXER

TOTAL TEMPERATURE - F AT  $X/D = 0.2$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.74$ ;  $\text{NPRf}=1.82$ ;  $\text{TTc}/\text{TTf}=2.79$ ;  $M=0.2$

1996 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

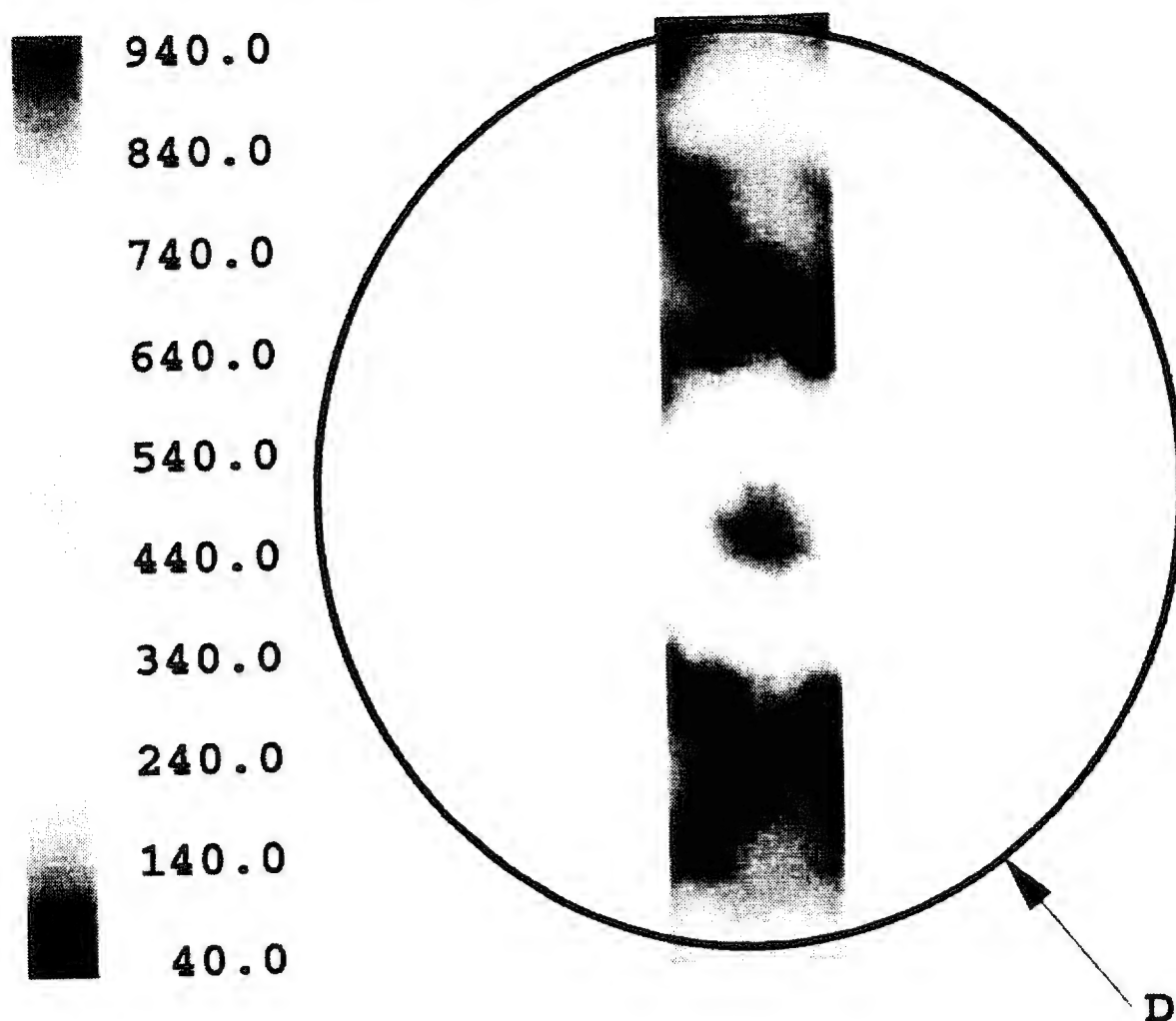
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FIGURE 4

# INTERNAL TONGUE MIXER

TOTAL TEMPERATURE - F AT  $X/D = 0.5$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.74$ ;  $\text{NPRf}=1.82$ ;  $\text{TTC}/\text{TTf}=2.79$ ;  $M=0.2$

1996 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

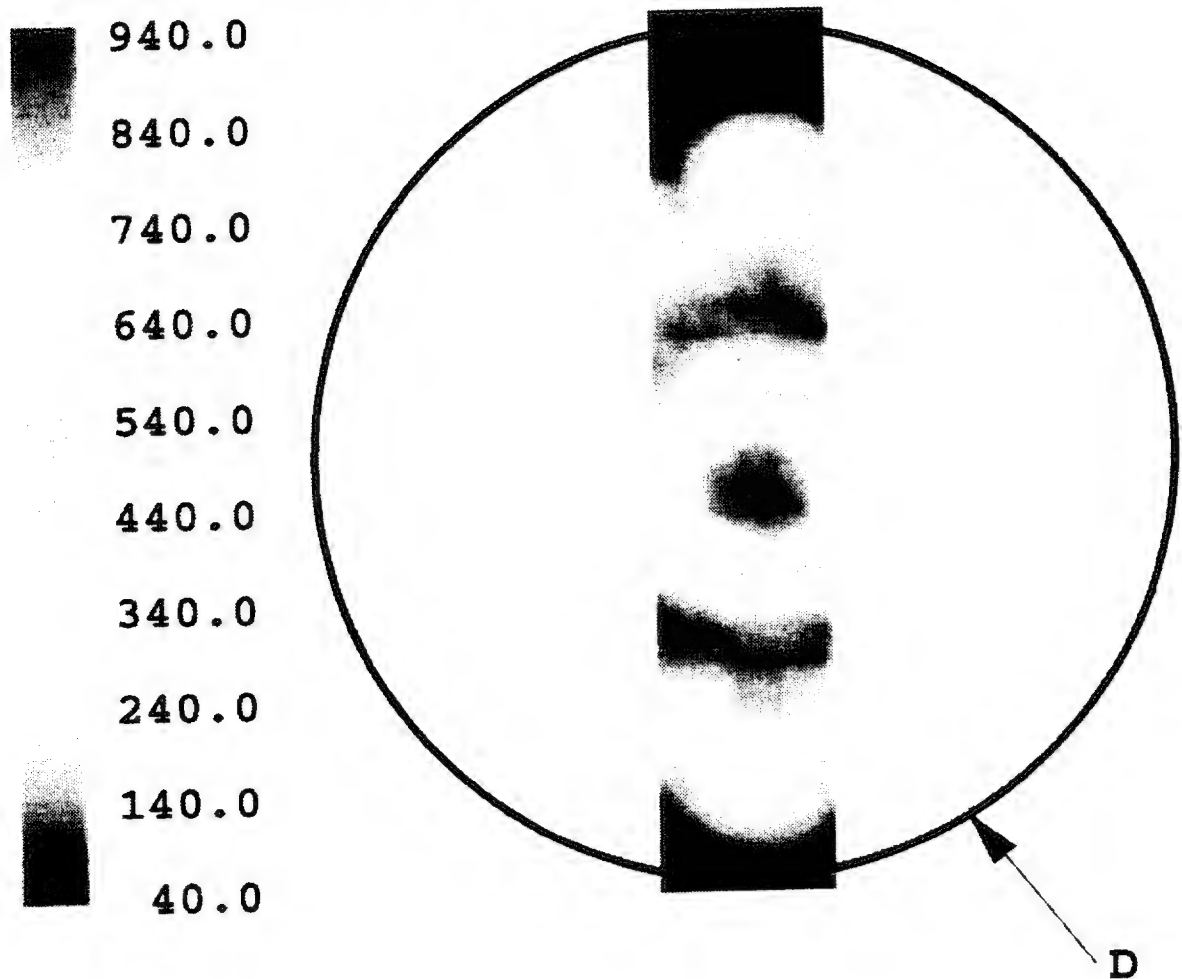
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FIGURE 5

12 LOBE BASELINE MIXER-100% NOZZLE LENGTH

TOTAL TEMPERATURE - F AT  $X/D = 0.5$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.74$ ;  $\text{NPRf}=1.82$ ;  $\text{TTC}/\text{TTf}=2.79$ ;  $M=0.2$

1996 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

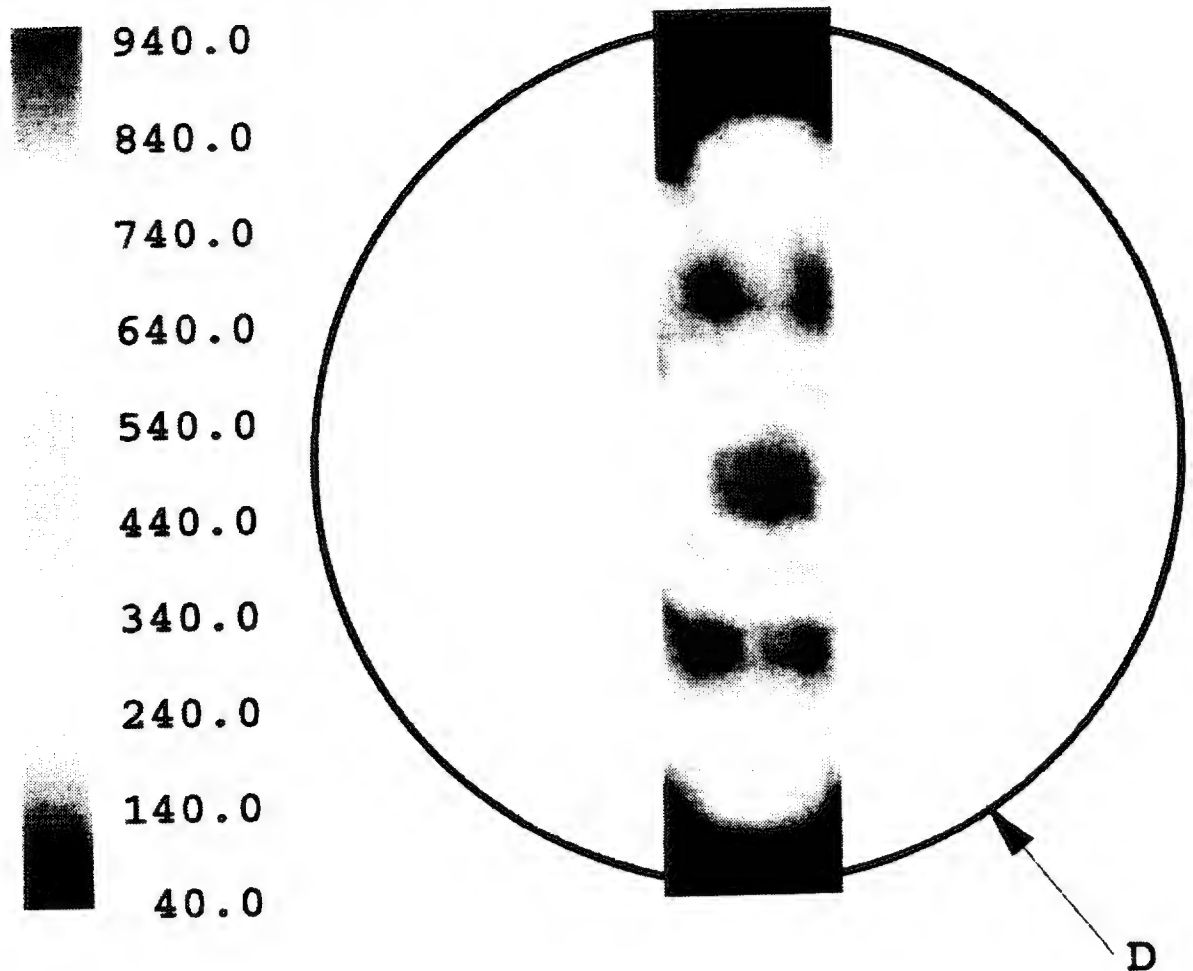
READING NUMBER T578



FIGURE 6

12 LOBE BASELINE MIXER-50% NOZZLE LENGTH

TOTAL TEMPERATURE - F AT  $X/D = 0.5$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.74$ ;  $\text{NPRf}=1.82$ ;  $\text{TTC}/\text{TTf}=2.79$ ;  $M=0.2$

1996 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

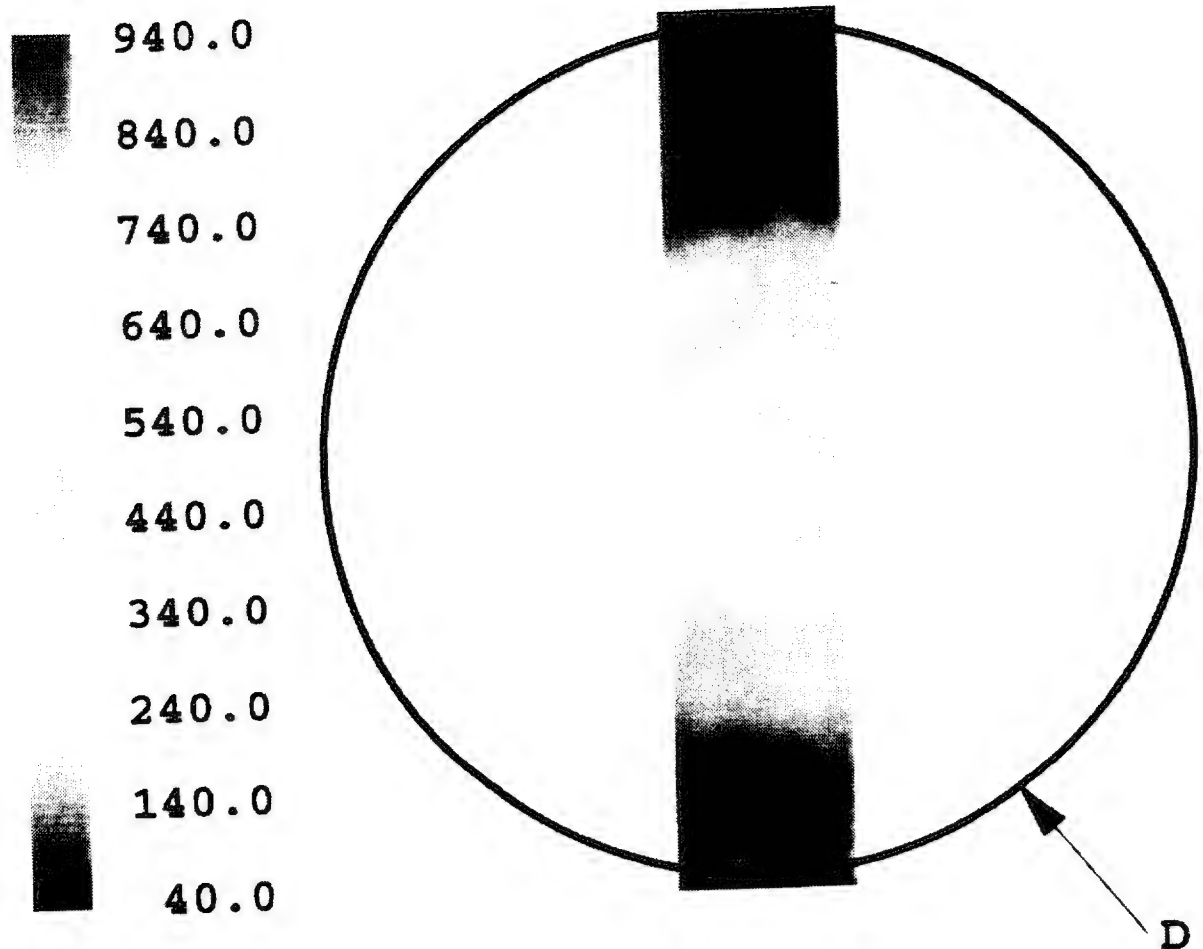
READING NUMBER T598



FIGURE 7

# 20 LOBE DEEP SCALLOP MIXER

TOTAL TEMPERATURE - F AT  $X/D = 0.5$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.74$ ;  $\text{NPRf}=1.82$ ;  $\text{TTC}/\text{TTf}=2.79$ ;  $M=0.2$

1996 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

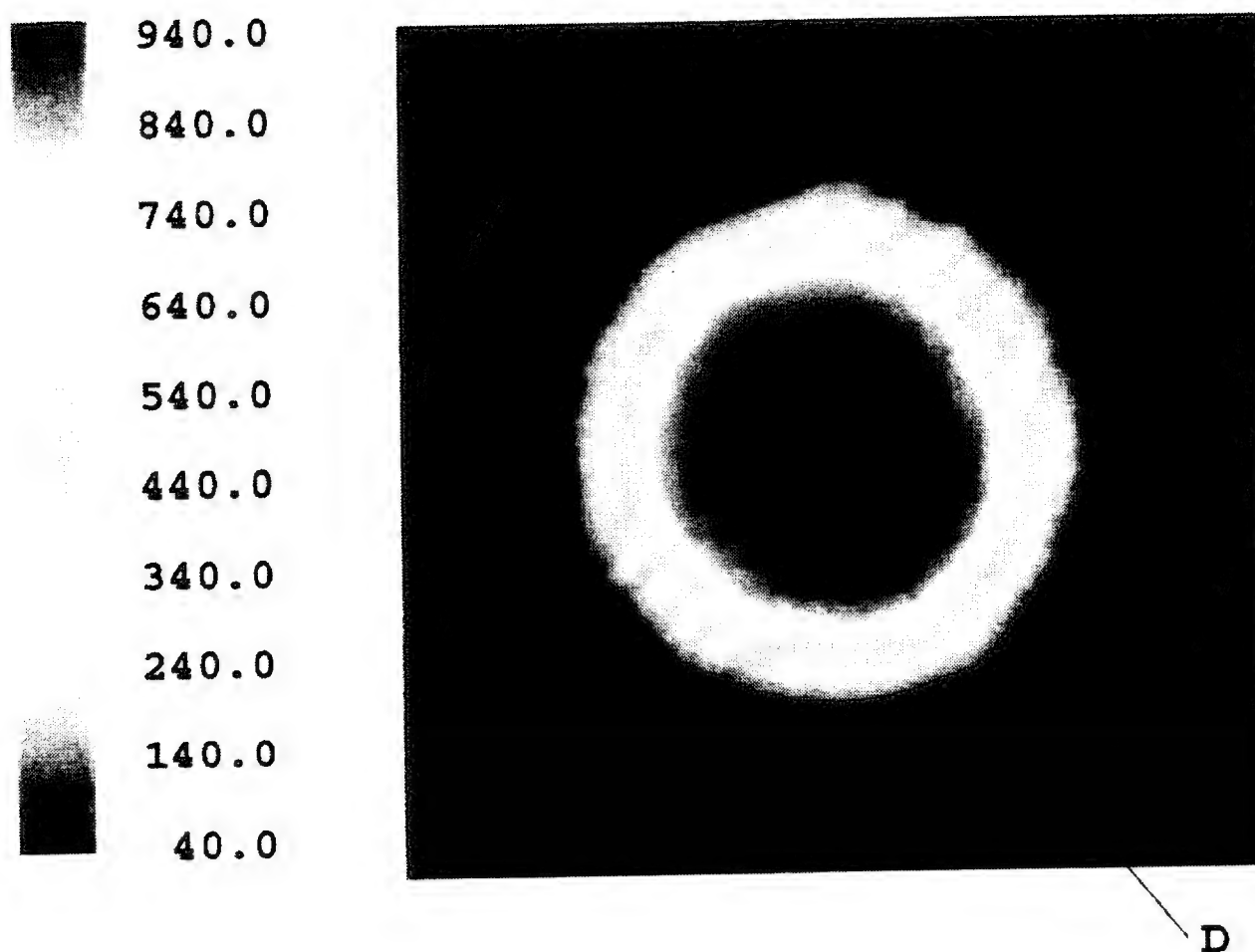
READING NUMBER T542



FIGURE 8

CONFLUENT MIXER

TOTAL TEMPERATURE - F AT  $X/D = 0.1$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.39$ ;  $\text{NPRf}=1.44$ ;  $\text{TTC}/\text{TTf}=2.34$ ;  $M=0.1$

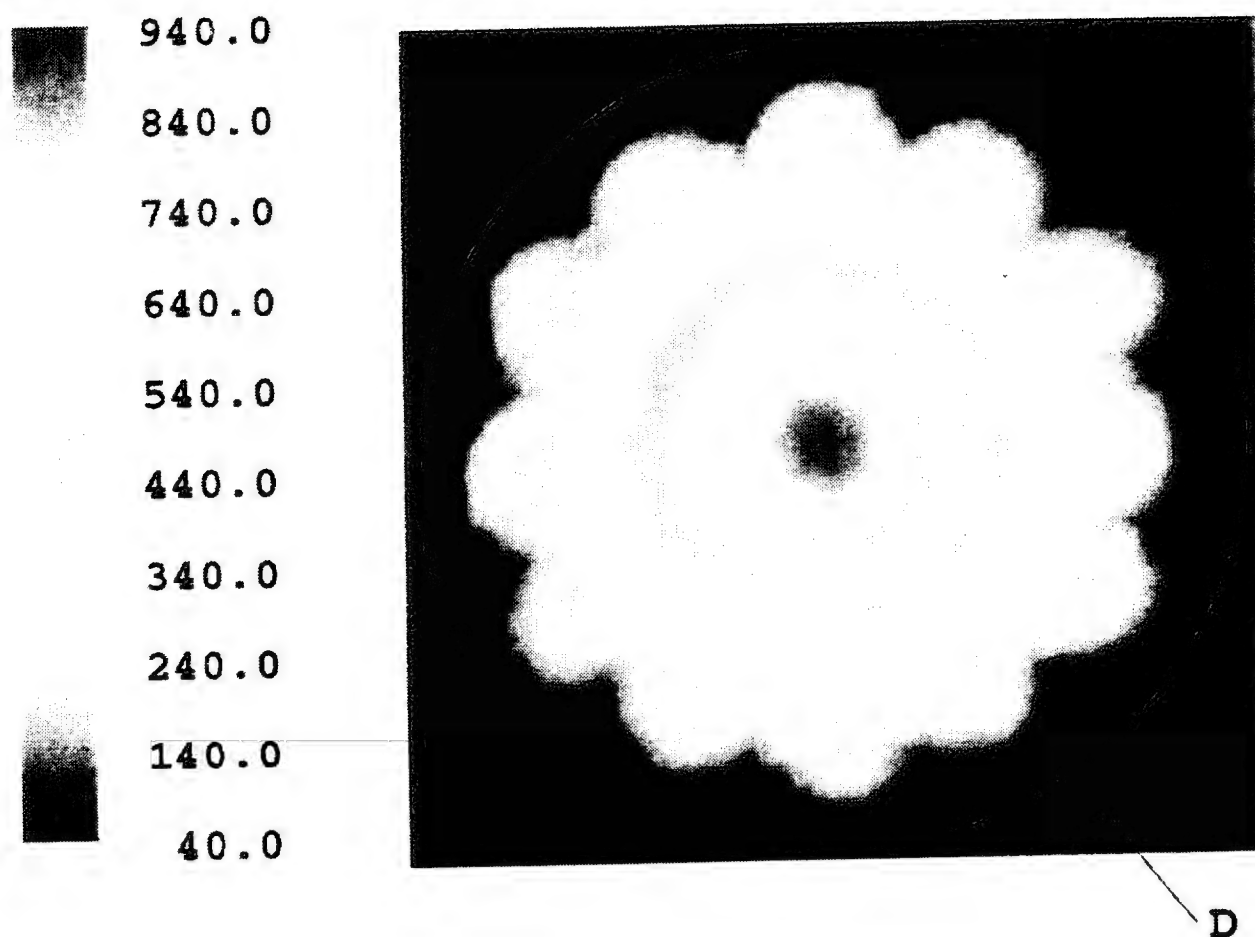
1995 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

READING NUMBER T324



FIGURE 9

12 LOBE CONVENTIONAL MIXER  
TOTAL TEMPERATURE - F AT  $X/D = 0.1$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.39$ ;  $\text{NPRf}=1.44$ ;  $\text{TTC}/\text{TTf}=2.34$ ;  $M=0.1$

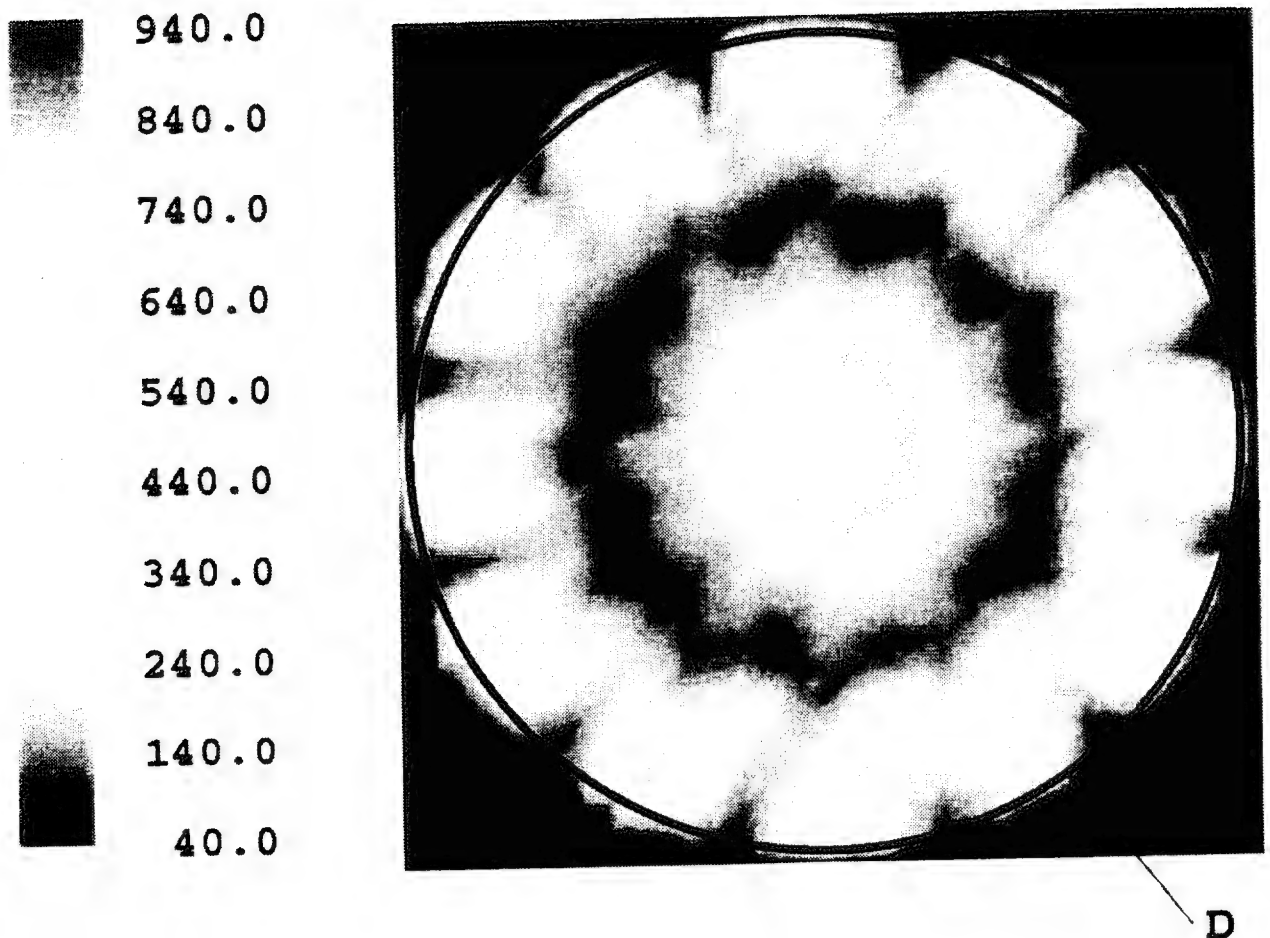
1995 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

READING NUMBER T355



FIGURE 10

12 LOBE ADVANCED MIXER  
TOTAL TEMPERATURE - F AT  $X/D = 0.1$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.39$ ;  $\text{NPRf}=1.44$ ;  $\text{TTc}/\text{TTf}=2.34$ ;  $M=0.1$

1995 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

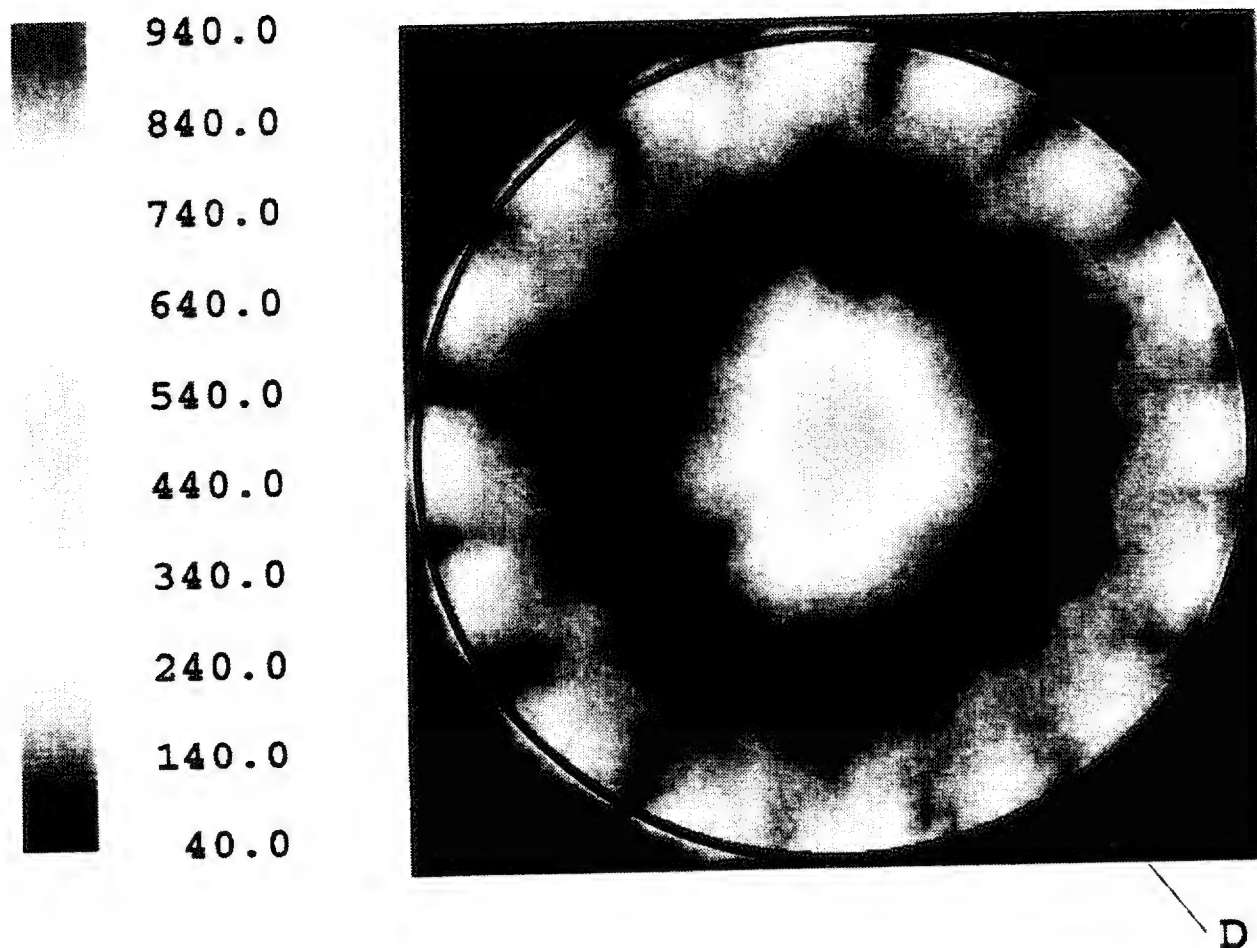
READING NUMBER T409



FIGURE 11

16 LOBE ACOUSTIC MIXER

TOTAL TEMPERATURE - F AT  $X/D = 0.1$



$D=7.25\text{in.}$ ;  $\text{NPRc}=1.39$ ;  $\text{NPRf}=1.44$ ;  $\text{TTC}/\text{TTf}=2.34$ ;  $M=0.1$

1995 NASA-LeRC ACOUSTIC MIXER/PLUME TESTS

READING NUMBER T378



FIGURE 12

Figure 12. Ratio of Maximum "Centerline" Total Temperature to Ideal Mixed Total Temperature vs.  $x/D$  for 12L Baseline, Internal Tongue, & 20L Mixers; NPR(core)=1.39, NPR(fan)=1.44,  $Tt_{core}/Tt_{fan}=2.34$ ,  $Mn/FS=0.2$ ; 1996 NASA-LeRC Acoustic Mixer / Plume Tests

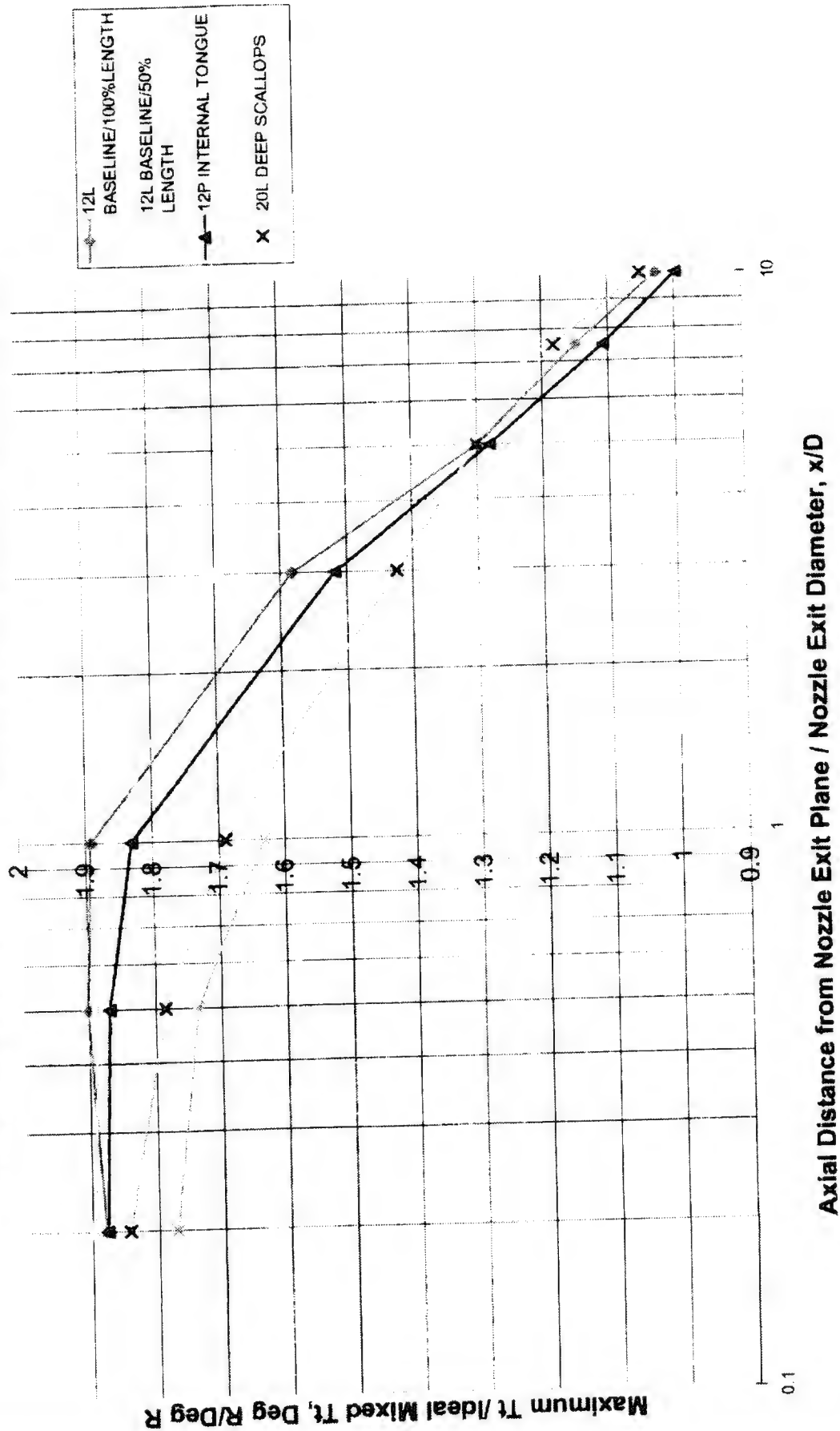




FIGURE 13

Ratio of Maximum "Centerline" Total Temperature to Ideal Mixed Total Temperature vs.  $x/D$   
for 20L Deep Mixer, 100% Nozzle Length; 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan,  
0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer / Plume Tests

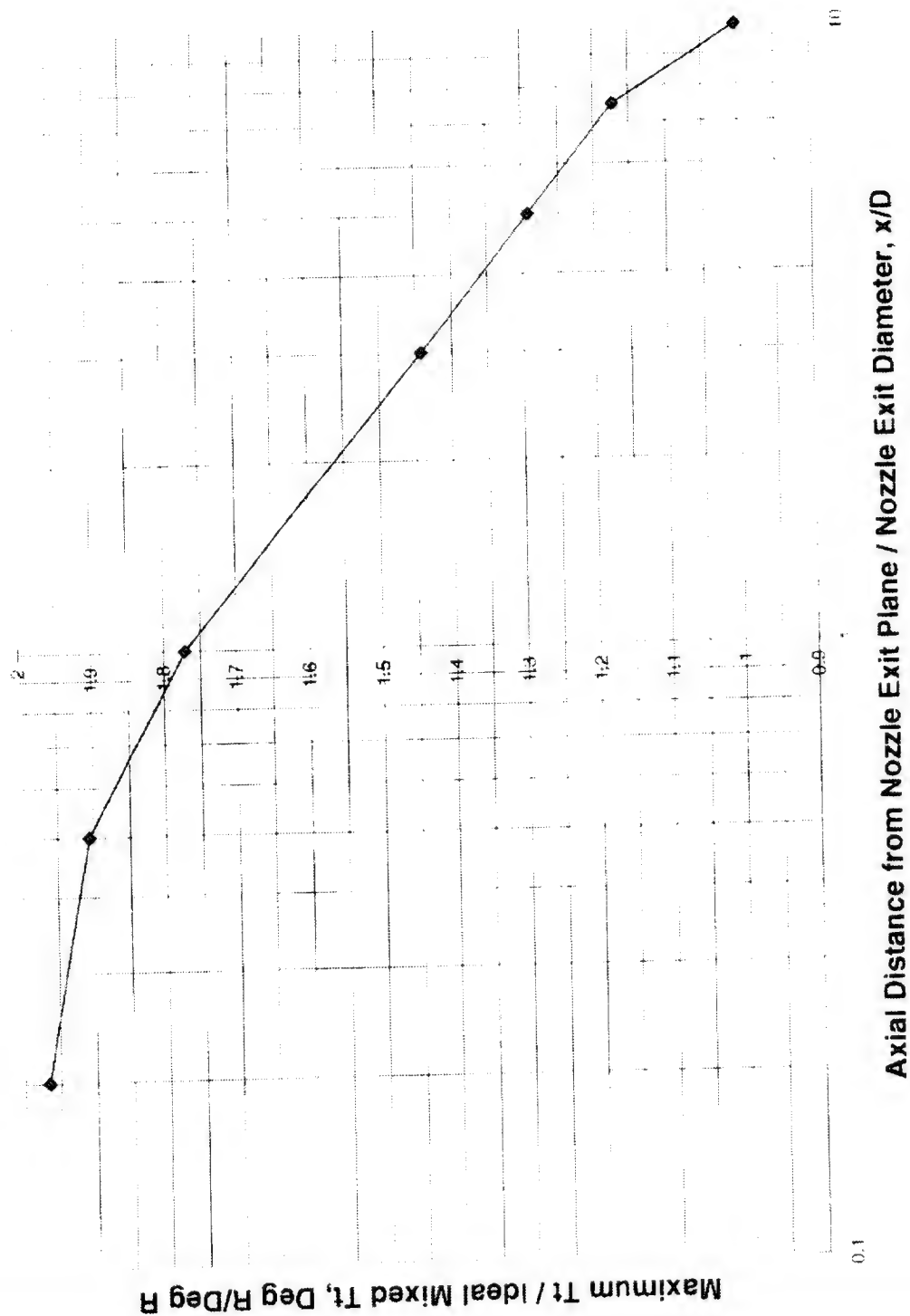




FIGURE 14

Internal Tongue Mixer - Nondimensional Tt Sweep at  $x/D=0.2$ , NPR(core)=1.54, NPR(fan)=1.61, NPR(mavg)=1.597, Mn)FS=0.2, Tt)idmix=649.7R, 1996 NASA-LeRC Mixer Plume Tests, Rdg# TT510

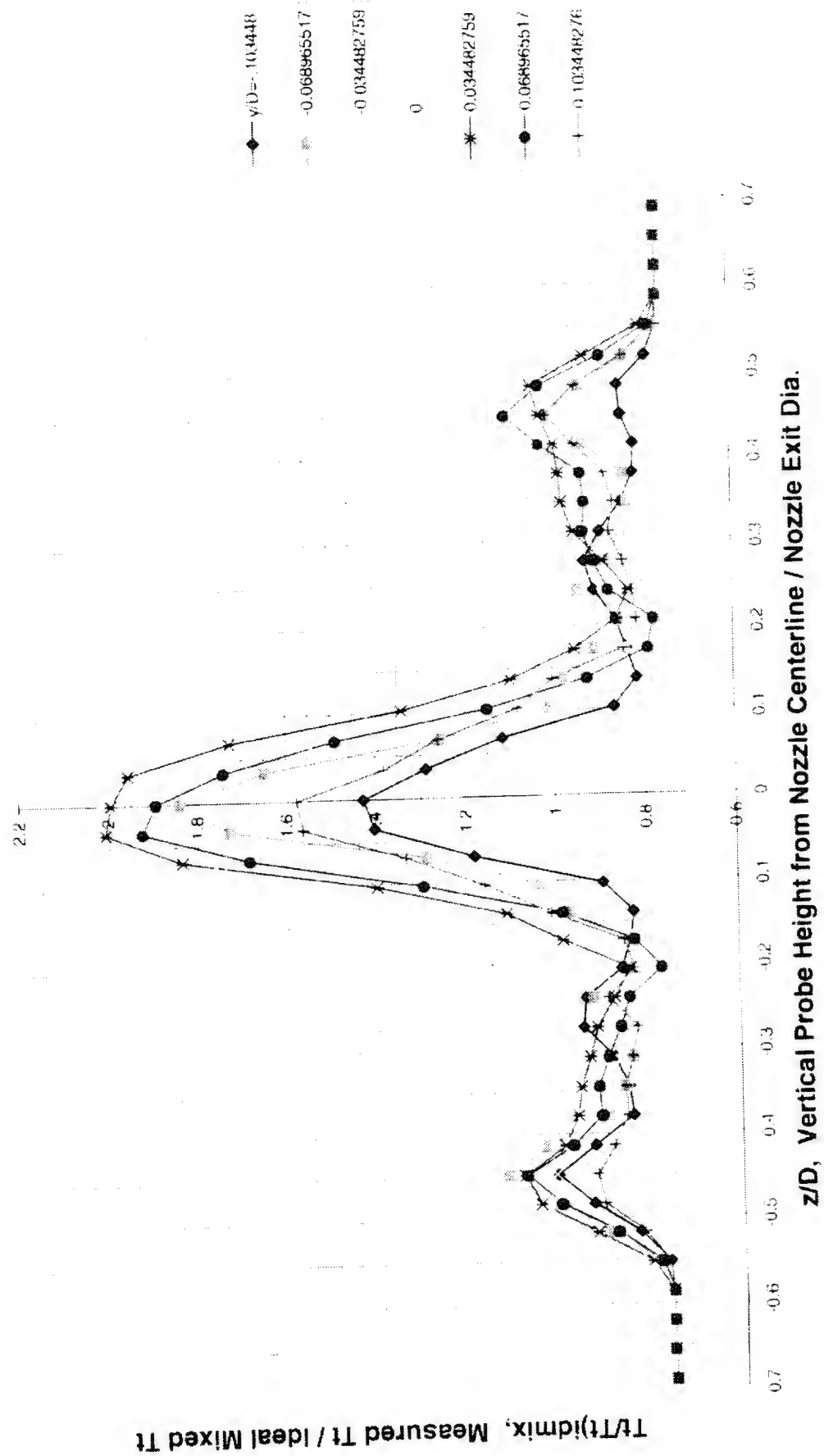




FIGURE 15

Ratio of Maximum "Centerline" Total Temperature to Ideal Mixed Total Temperature vs.  $x/D$   
 for 12L Baseline, 20L Deep & Internal Tongue Mixers; NPR)core=1.74, NPR)fan=1.82,  
 $Tt)core/Tt)fan=2.79$ , 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer / Plume Tests

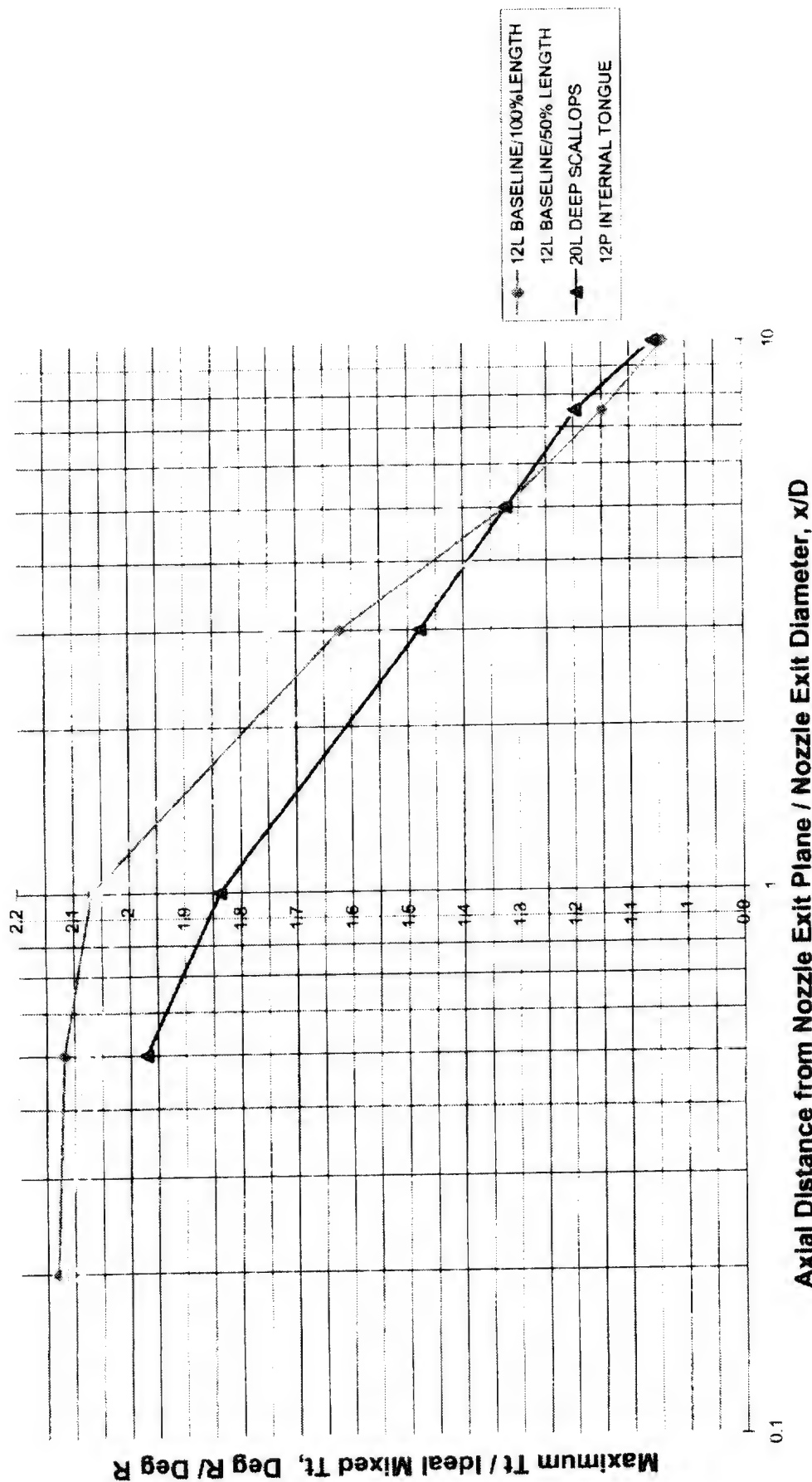




FIGURE 16

Example of Extrapolation of Maximum Total Temperature Decay to Ambient Sink Temperature

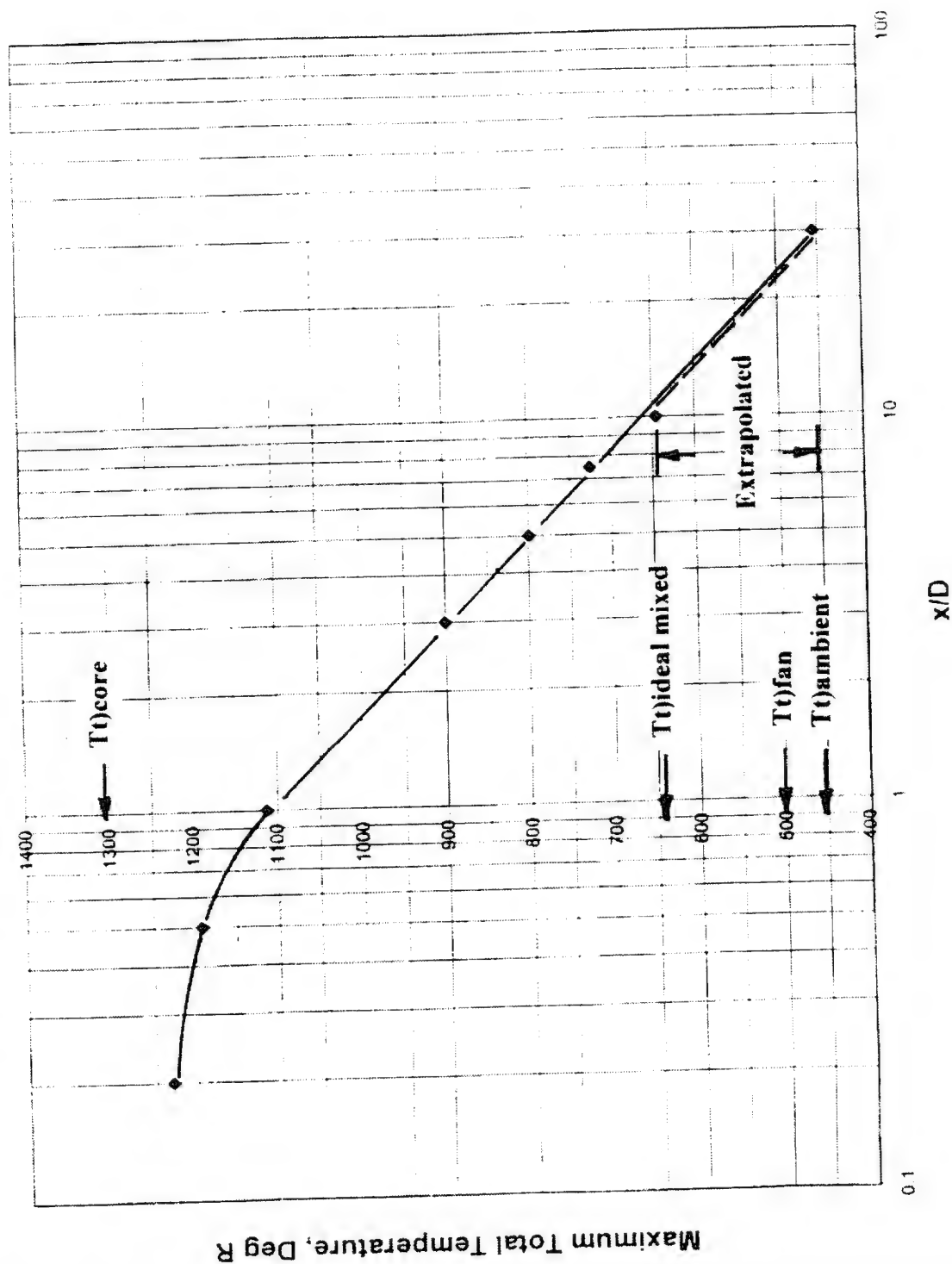
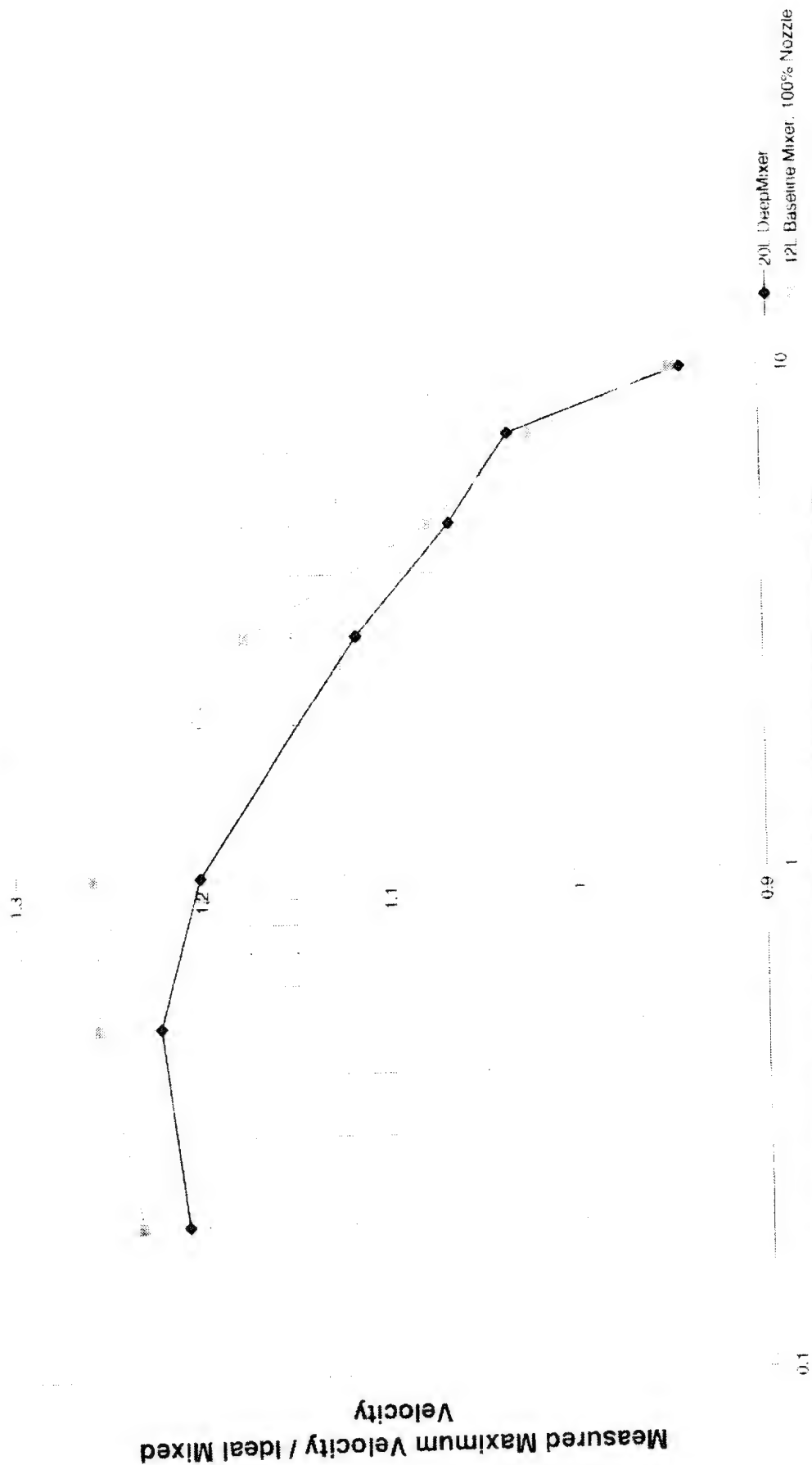




FIGURE 17

Ratio of Maximum "Centerline" Velocity to Ideal Mixed Velocity for 20L Deep and 12L Baseline Mixers; 1.54 NPR)core, 1.61 NPR)fan, 2.62 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer / Plume Tests



Axial Distance from Nozzle Exit Plane / Nozzle Diameter, x/D



FIGURE 18

Ratio of Maximum "Centerline" Velocity to Ideal Mixed Velocity for 20L Deep and 12L Baseline Mixers; 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests

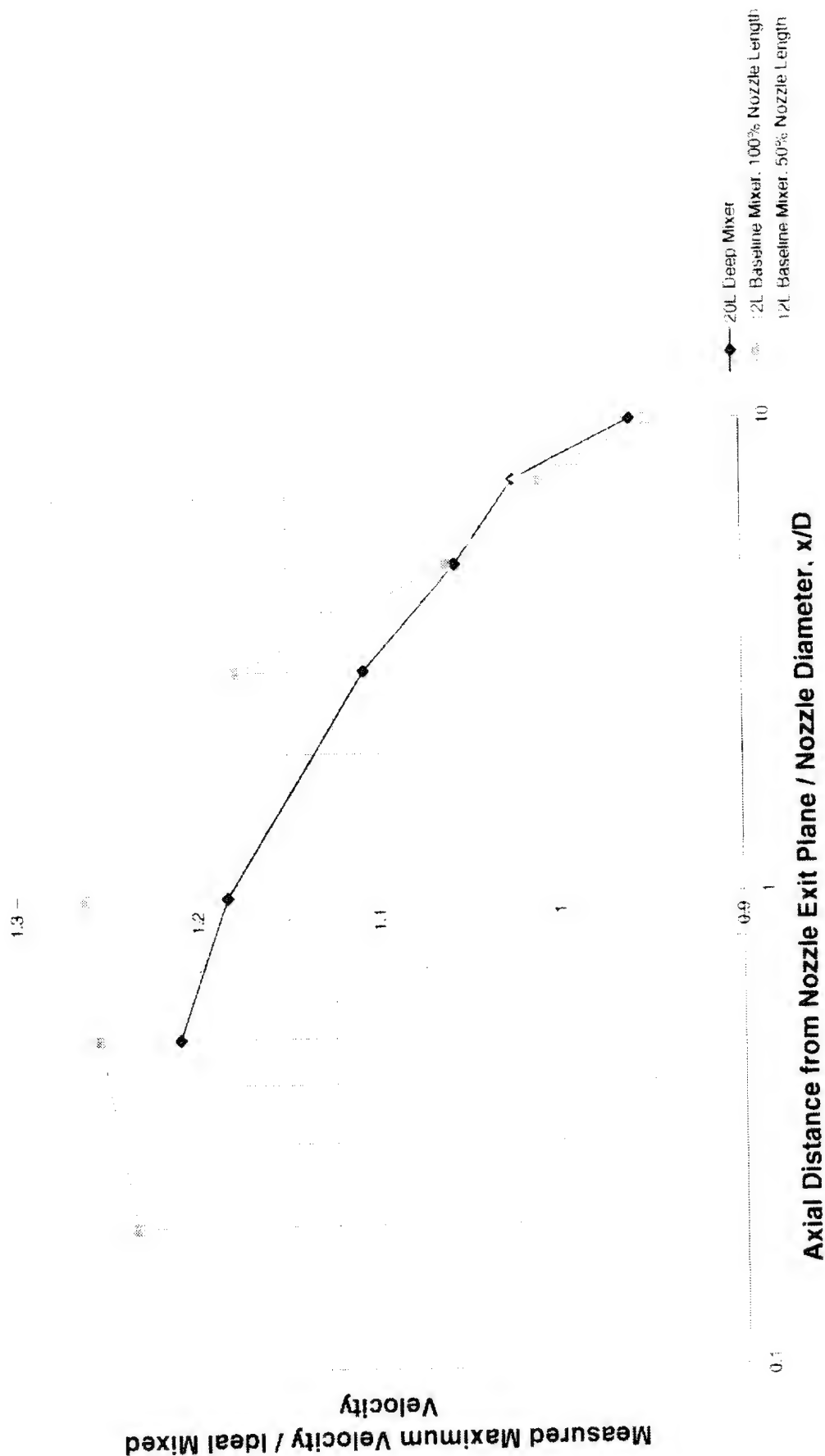
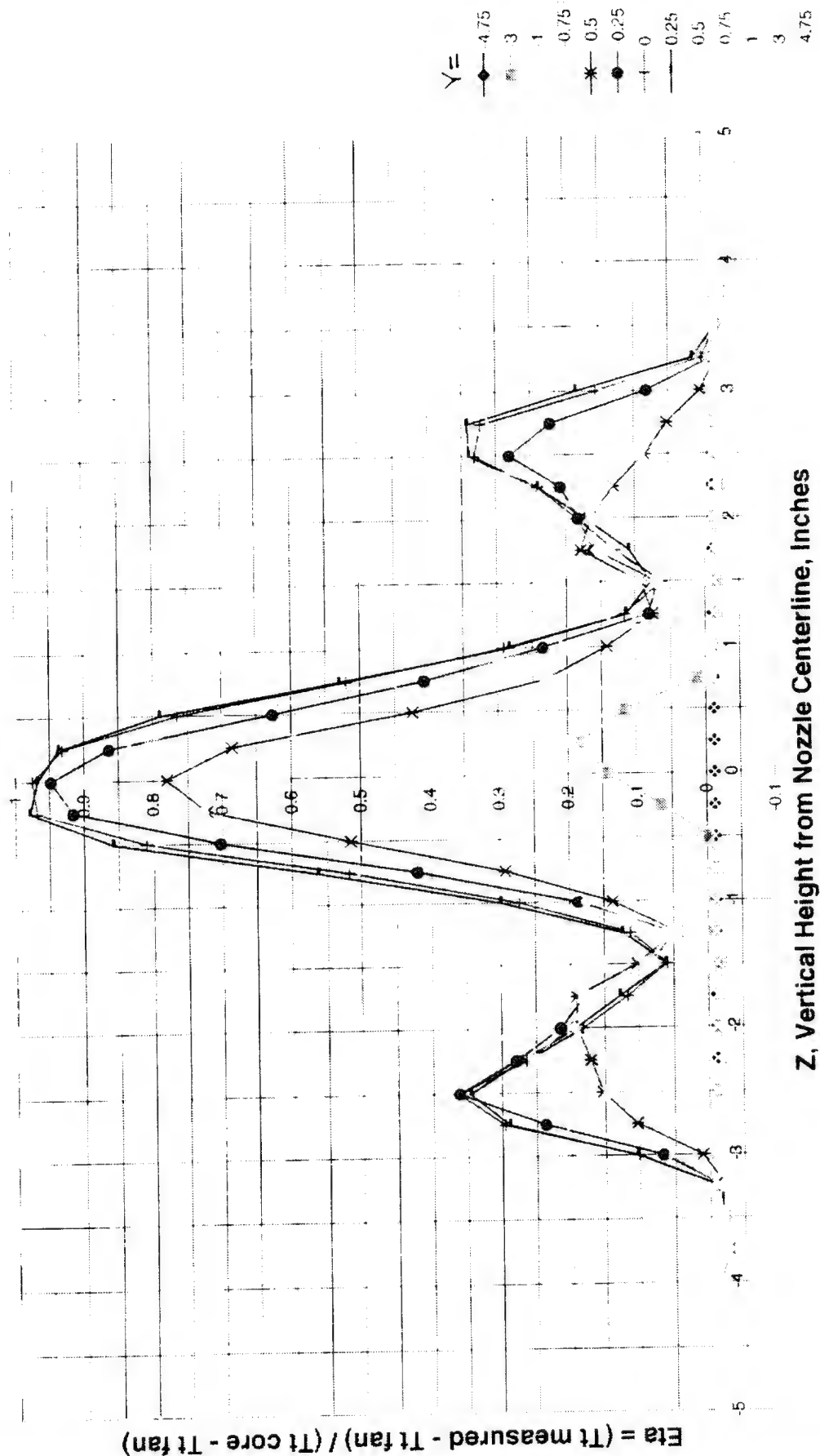




FIGURE 19

Eta Distribution for 12L Baseline Mixer at  $x/D=0.2$ , 100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt(core/Tt)fan, 0.2Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # TT576





Eta Distribution for 12L Baseline Mixer at  $x/D=0.2$ , 50% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # TT597

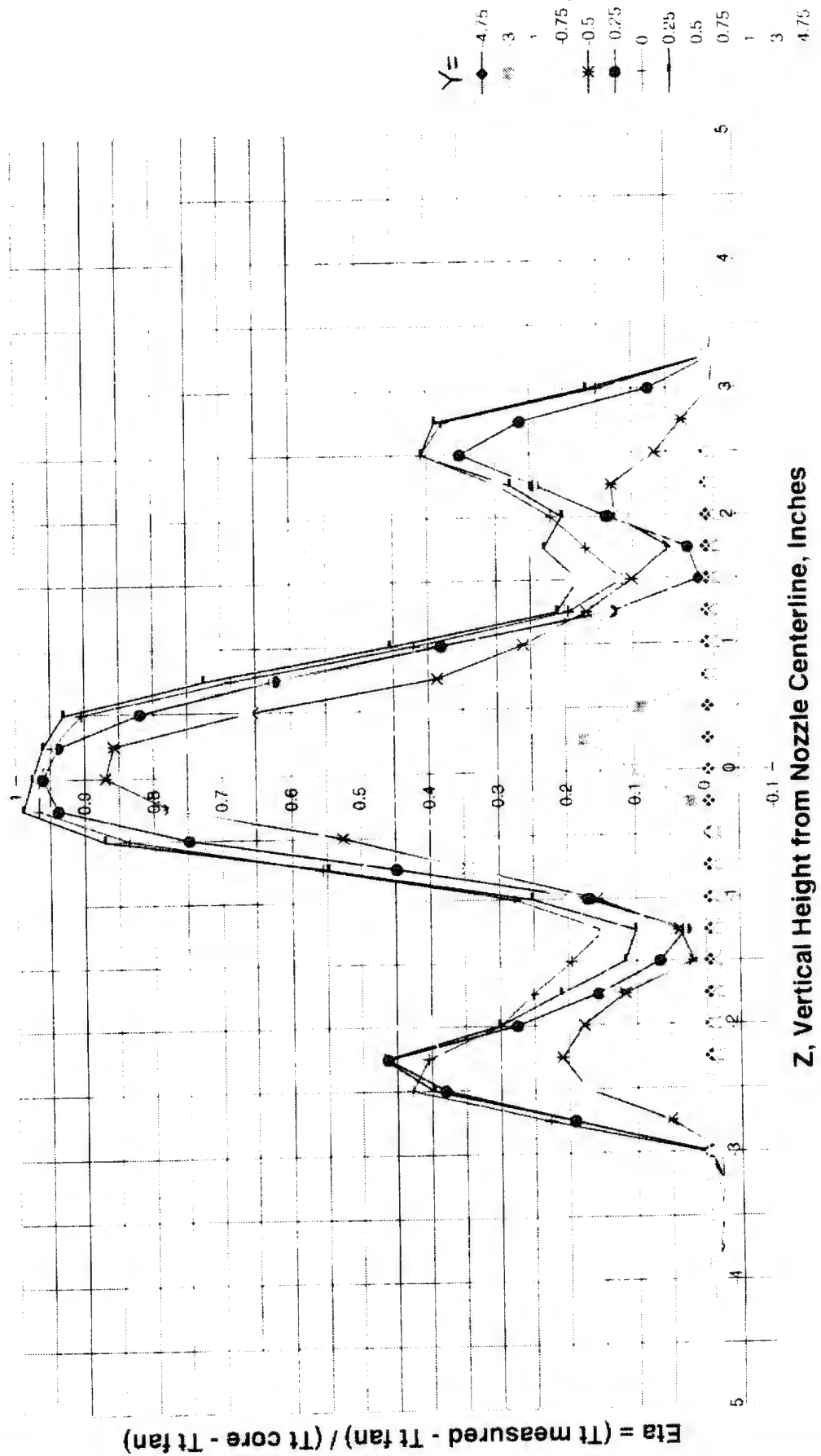




FIGURE 21

Eta Distribution for Internal Tongue Mixer at  $x/D=0.2$ , 100% Nozzle Length, 1.74 NPR)core, 1.82NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # TT508

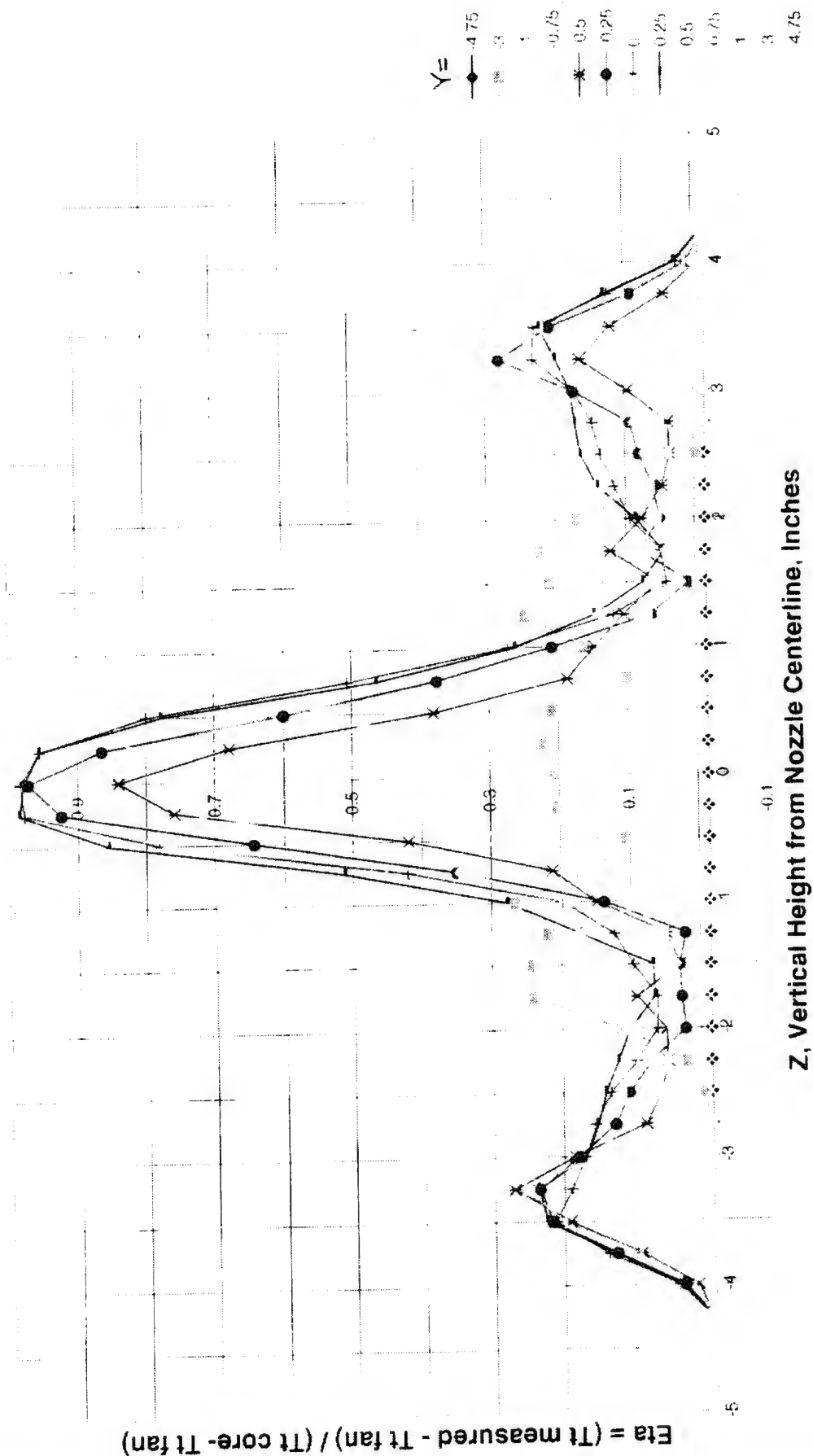
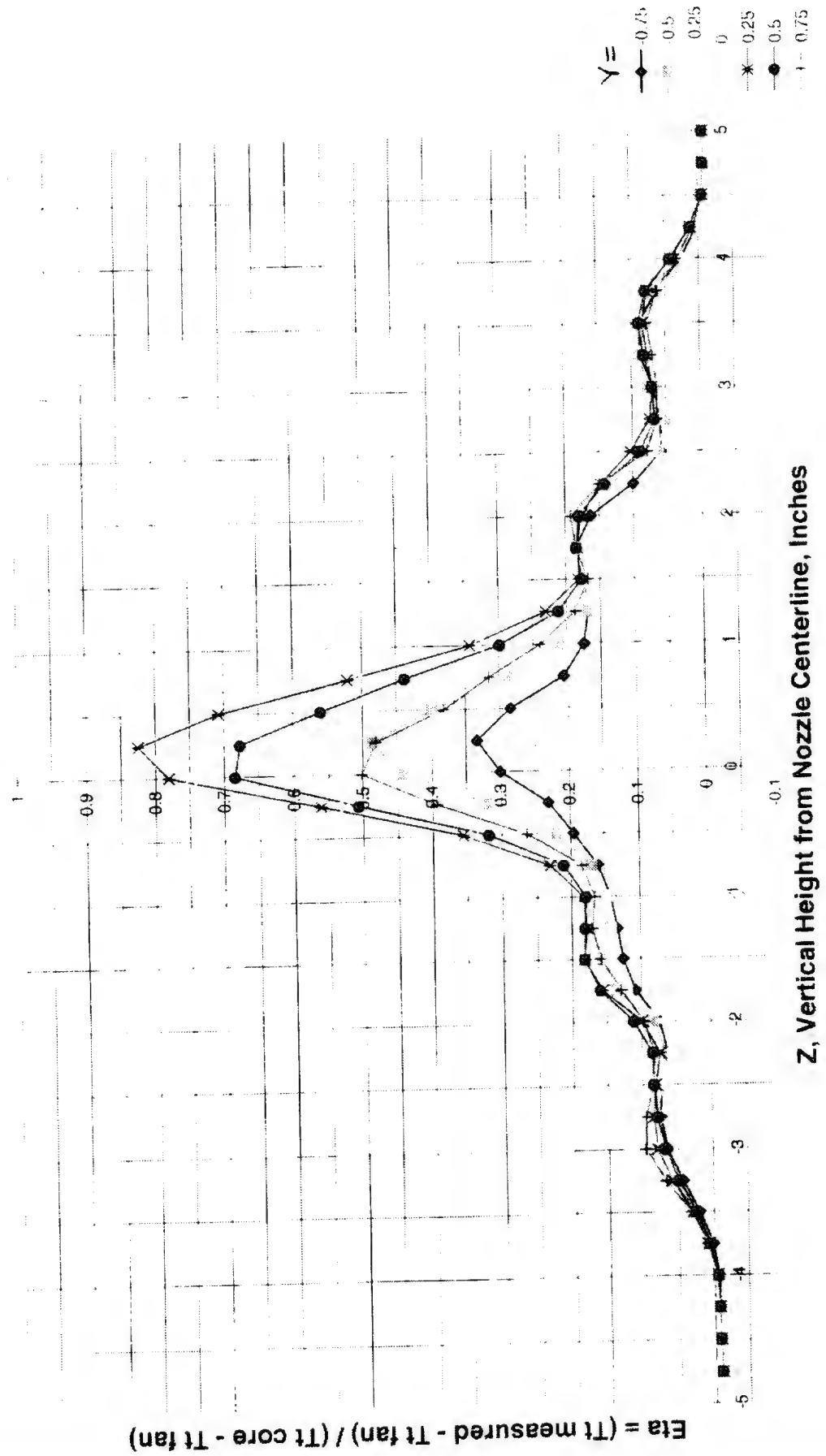




FIGURE 22

Eta Distribution for 20L Deep Mixer at  $x/D=0.5$ , 100% Nozzle Length, 1.74 NPR)core, 1.82 NPR)fan, 2.79 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # TT542





**Figure 23 not available at time of printing.**



FIGURE 24

Eta Distribution for 20L Deep Mixer at  $x/D=0.2$ , 100% Nozzle Length, 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # TT550

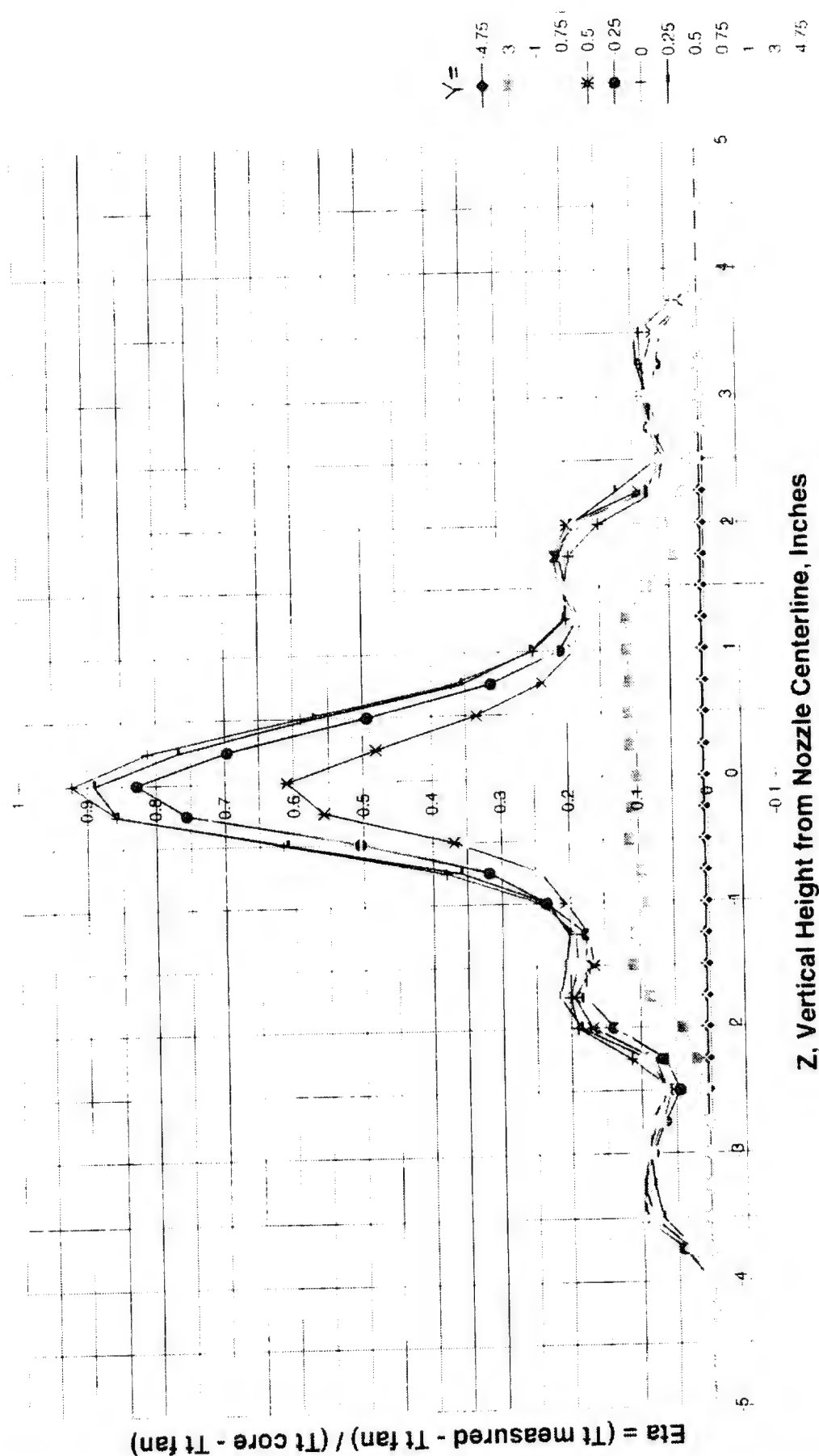




FIGURE 25

Eta Distribution for 20L Unscalloped Mixer at  $x/D=0.2$ , 100% Nozzle length, 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.2 Mn)FS; 1996 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # TT609

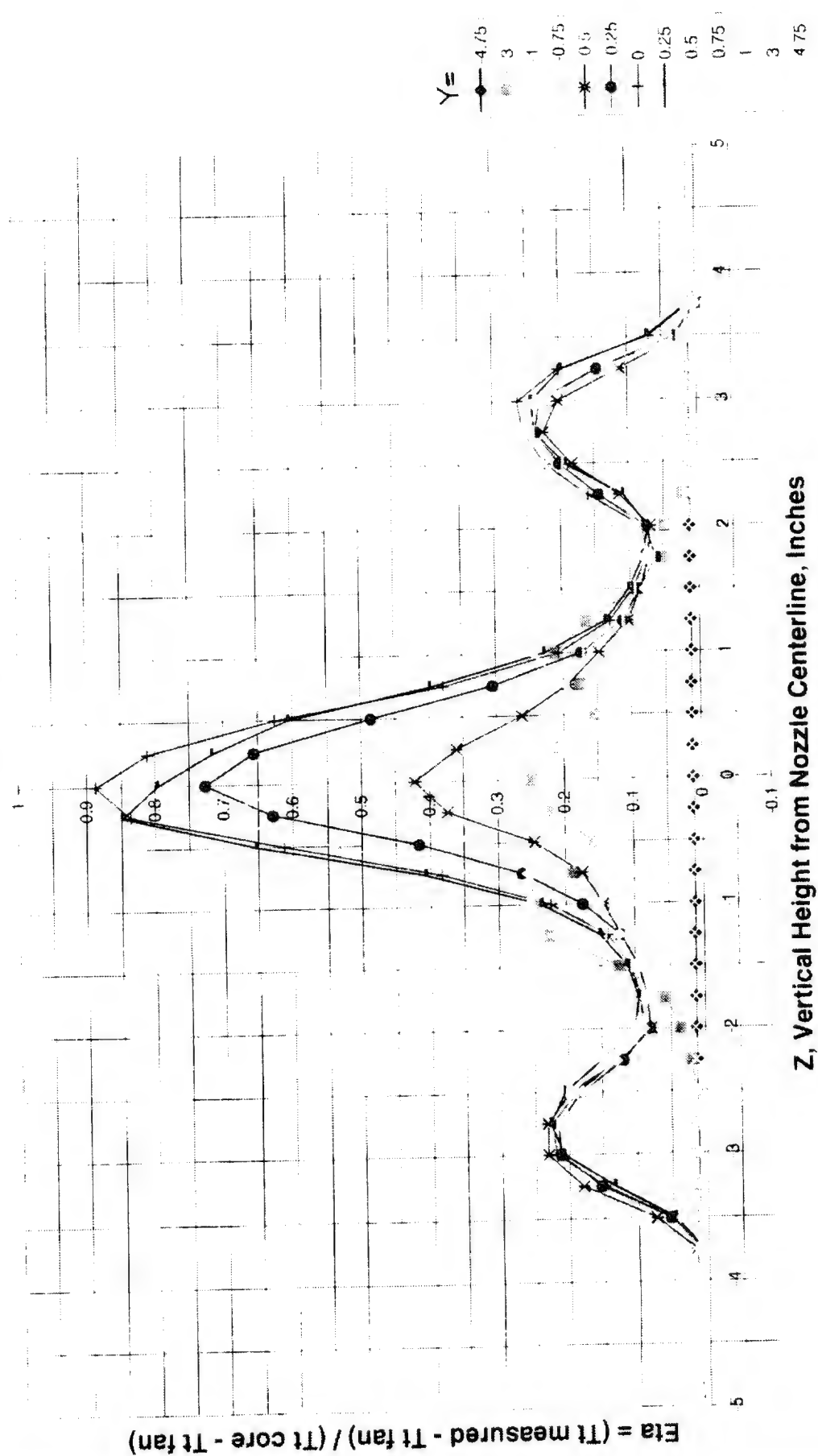




FIGURE 26

Max Centerline Eta at  $x/D=0.5$  vs. Fan NPR for 20L Deep, Internal Tongue, and 12L Baseline Mixers; 1996 NASA-LeRC Acoustic Mixer / Plume Tests

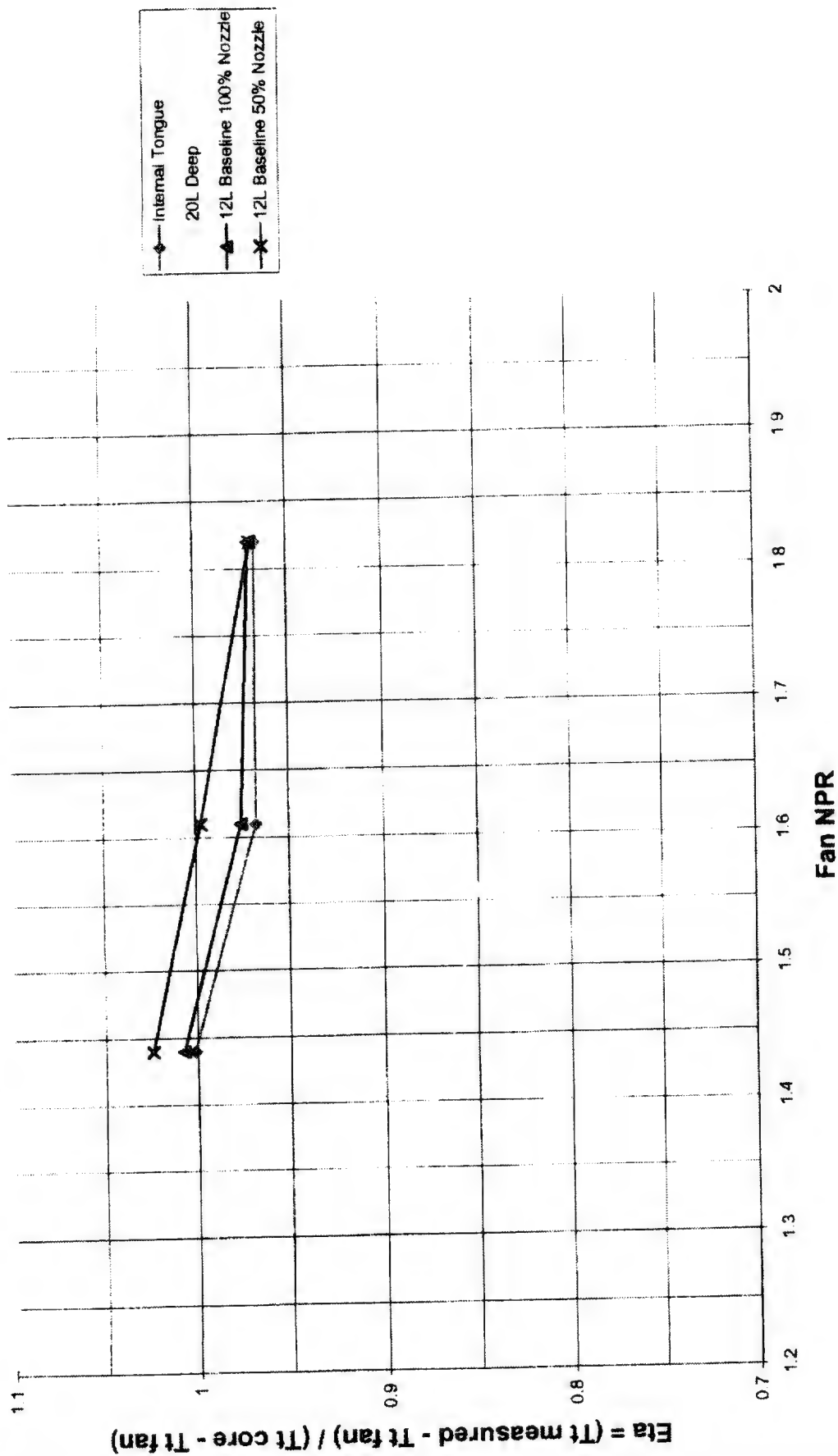




Figure 27(a). Confluent mixer Tt survey at  $x/D=0.1$  at TO #1,  $M(fj) = 0.1$ . 1995 NASA-LeRc Test #T324

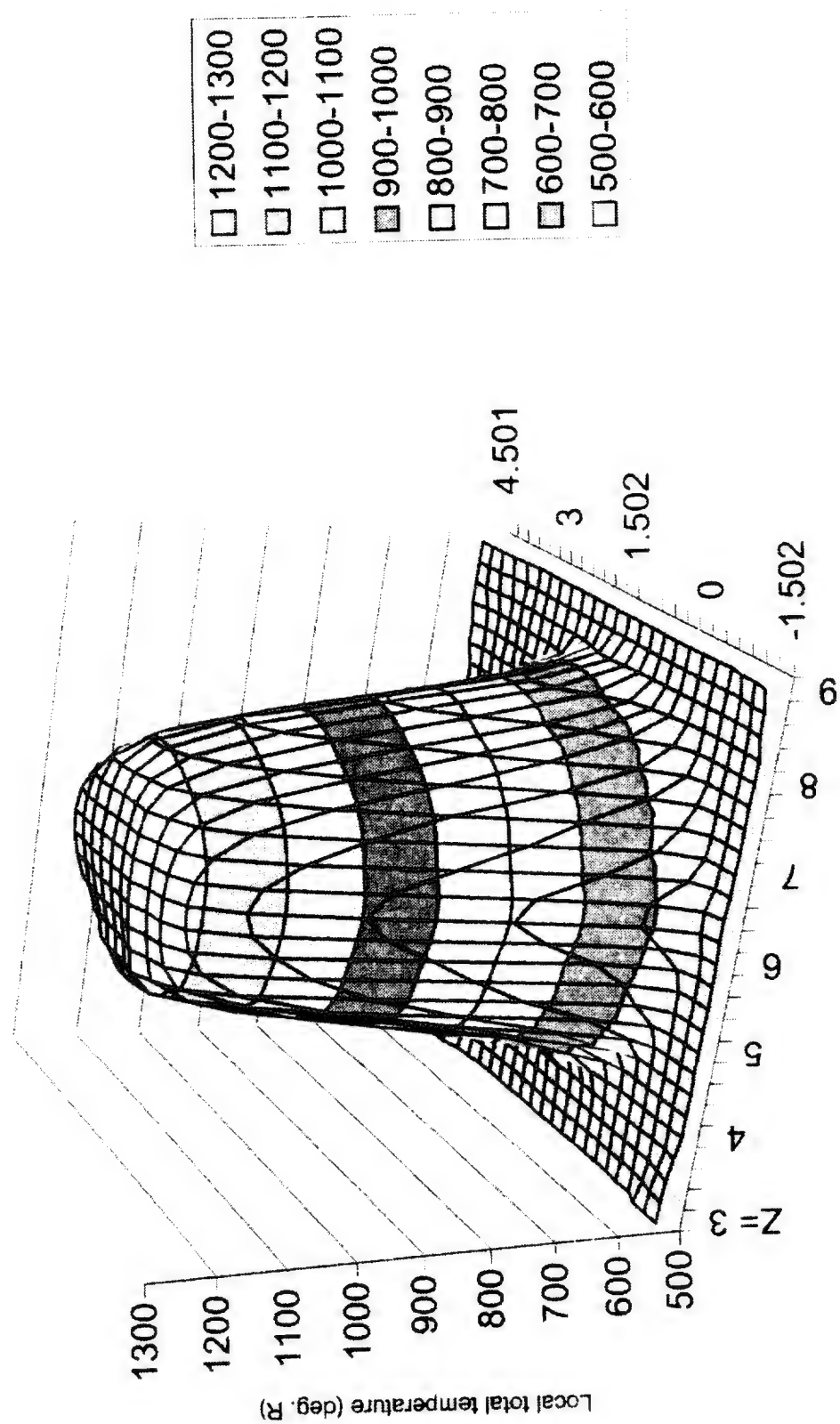




FIGURE 27 (b)

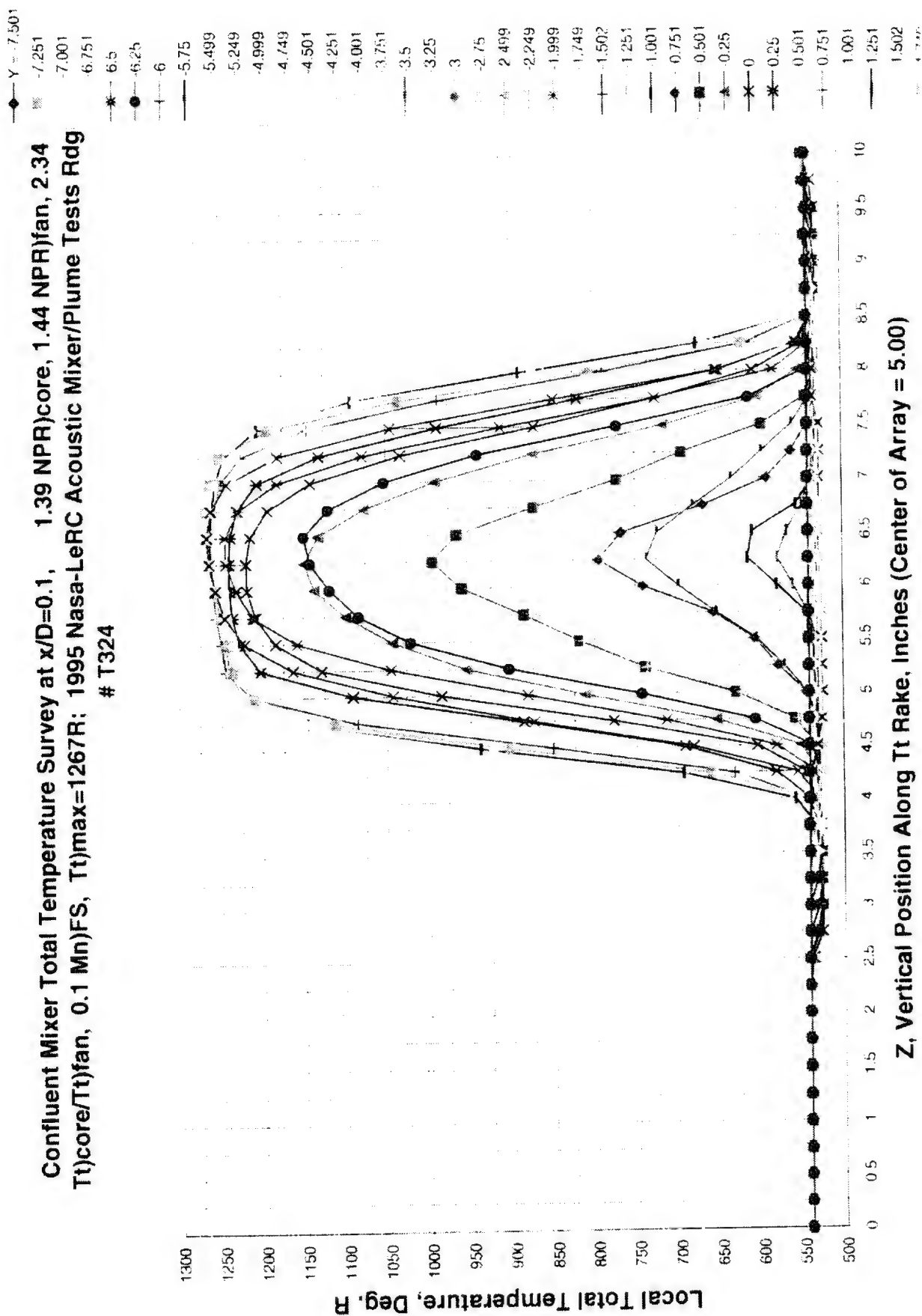




FIGURE 28

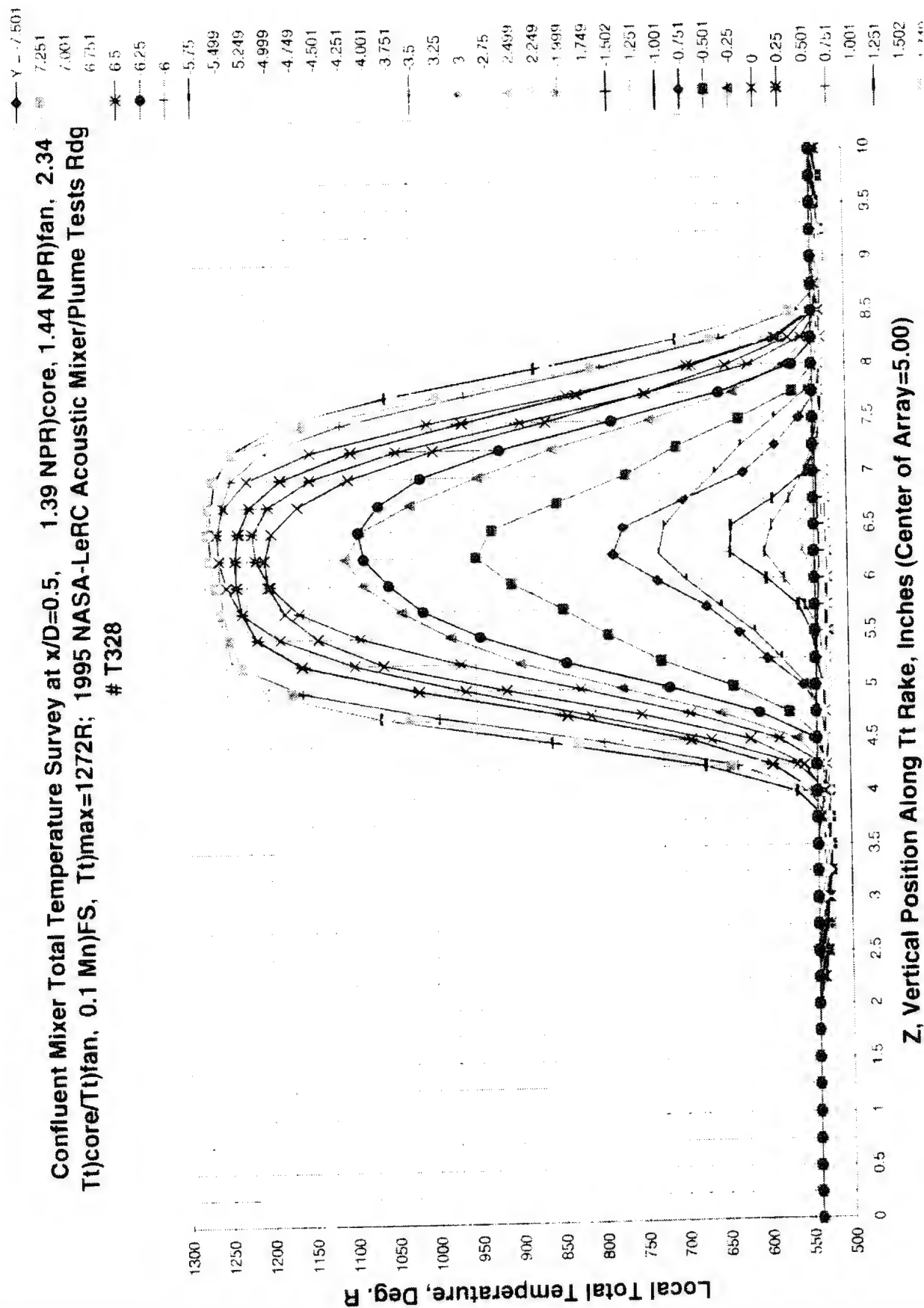




FIGURE 29

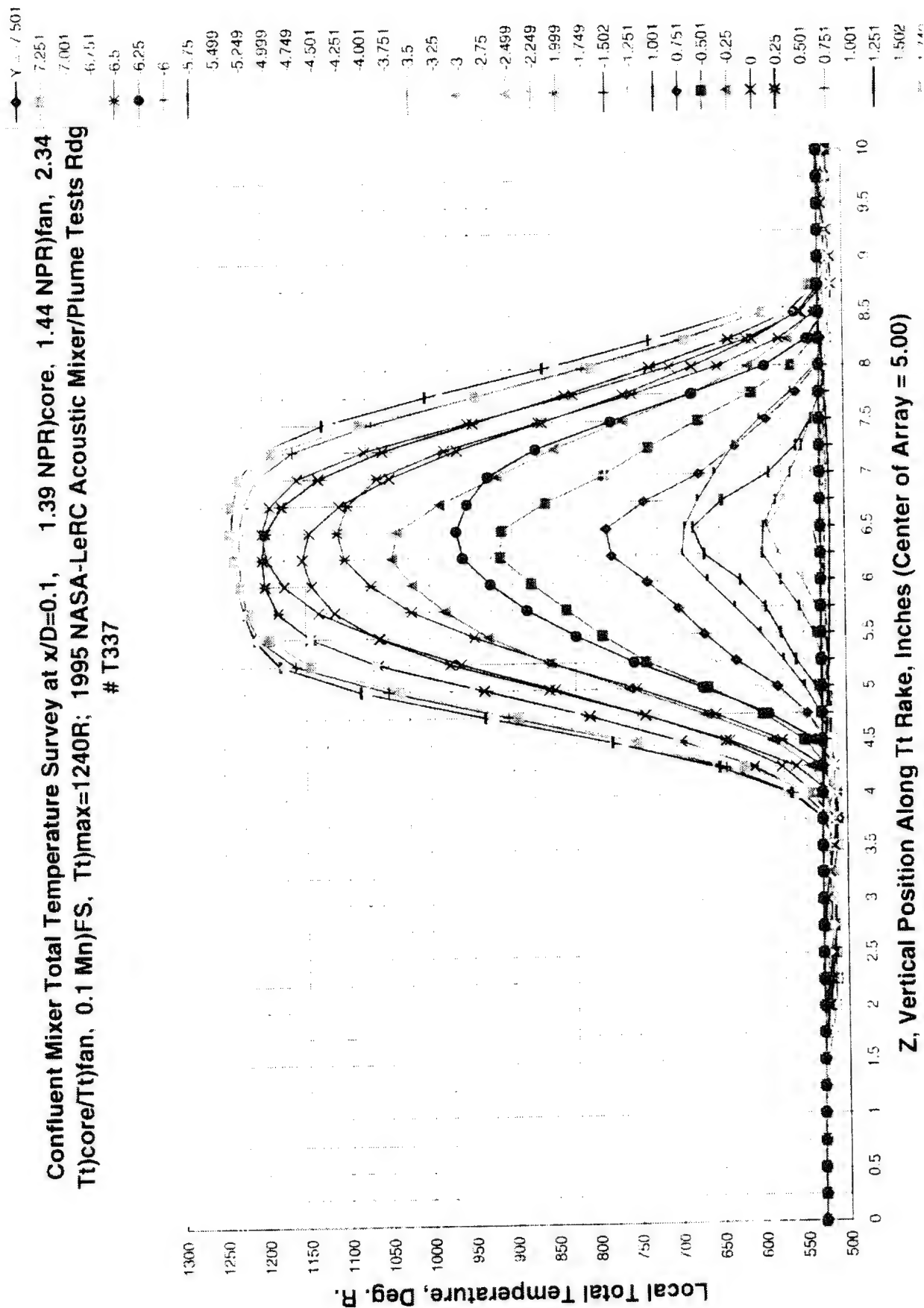




Figure 30(a). Confluent Mixer Total Temperature Survey at  $x/D=4.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)coreTt)fan, 0.1 Mn)FS, Tt)max=1152R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # T338

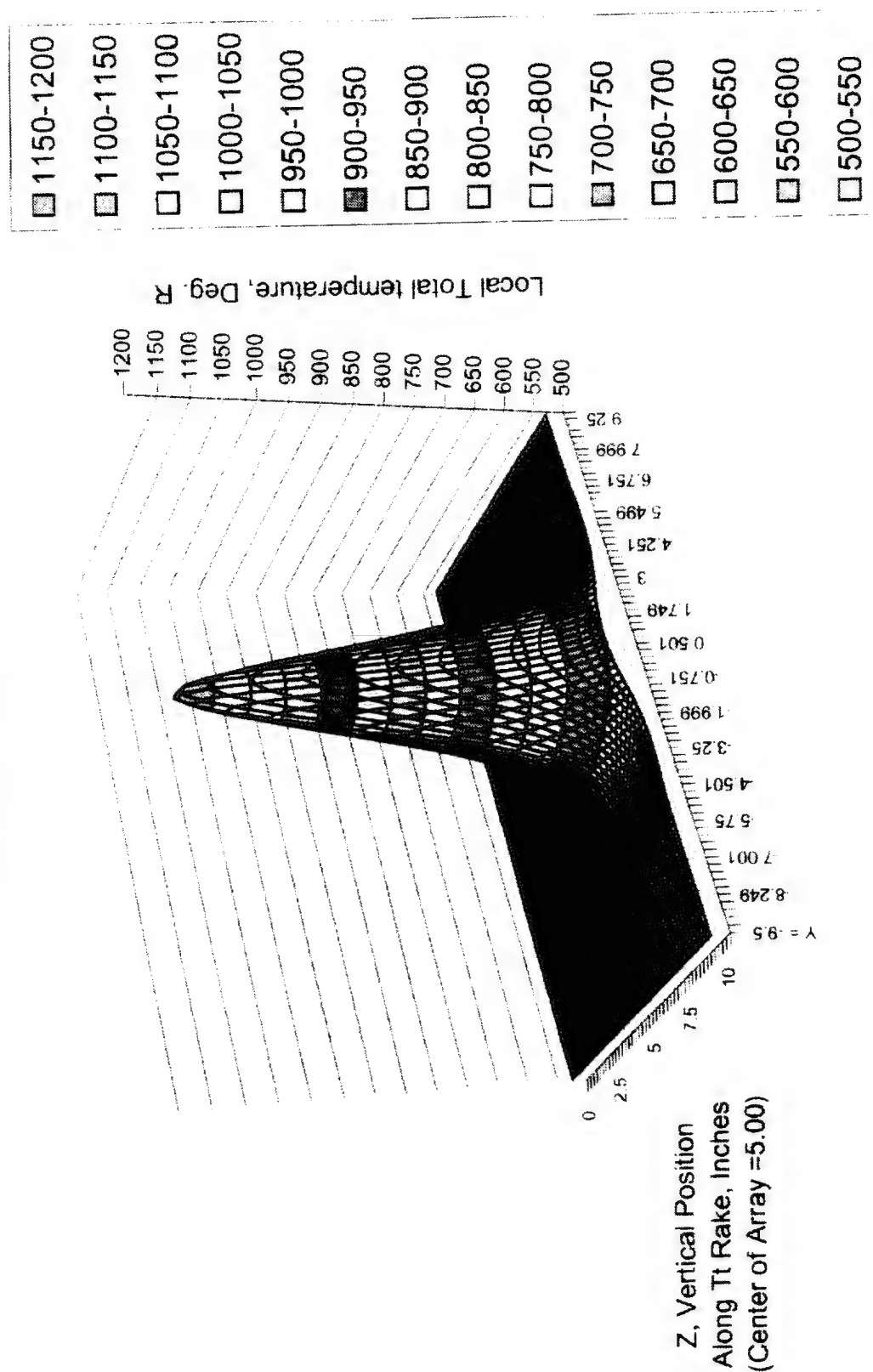




FIGURE 30(b)

Confluent Mixer Total Temperature Survey at  $x/D=4.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34  
Tt)coreTt)fan, 0.1 Mn)FS, Tt)max=1152R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests Rdg  
# T338

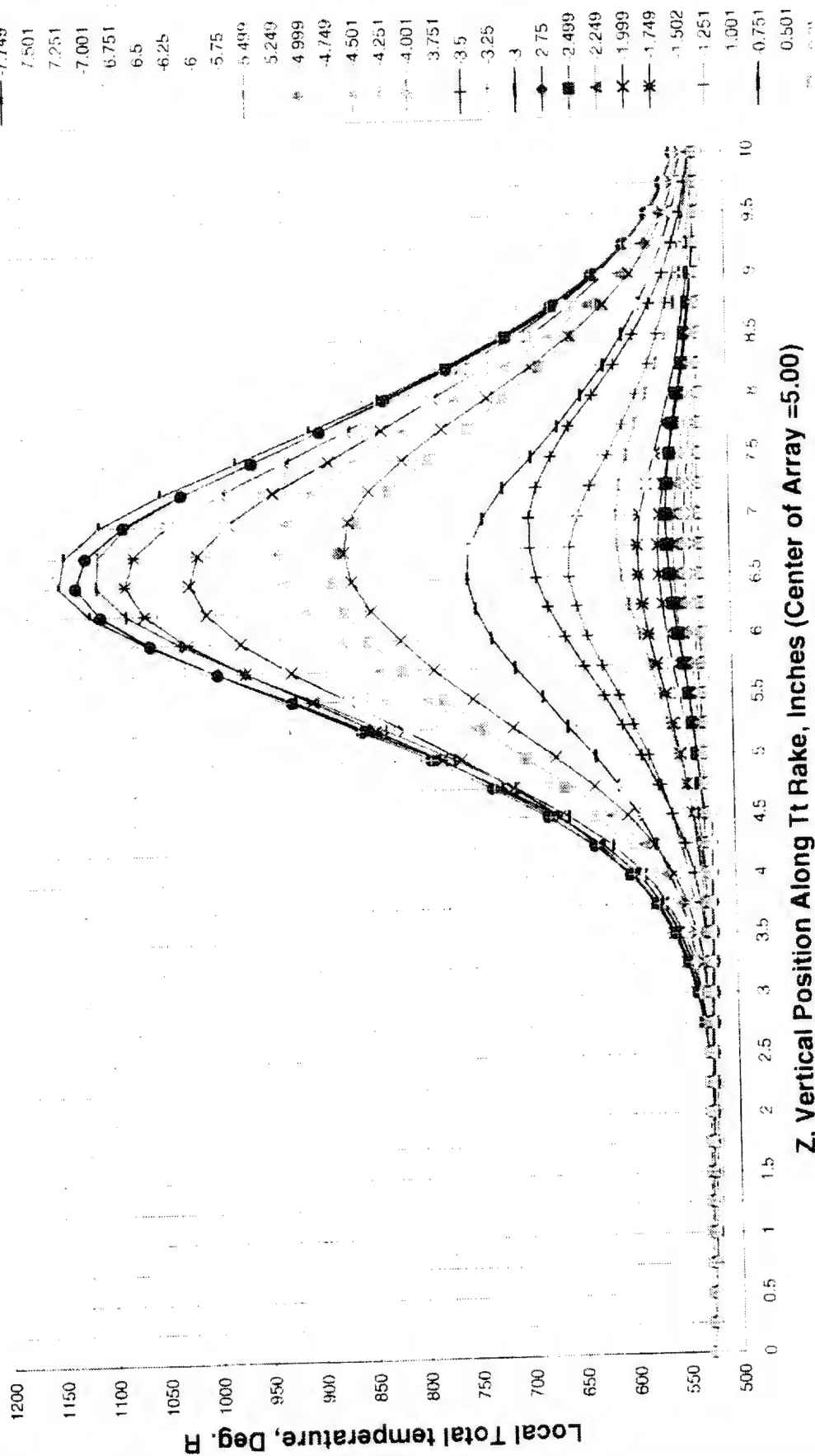




FIGURE 31

Confluent Mixer Total Temperature Survey at  $x/D=4.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34  
 Tt)core/Tt)fan, 0.3 Mn)FS, Tt)max = 1157R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests Rdg  
 # T341

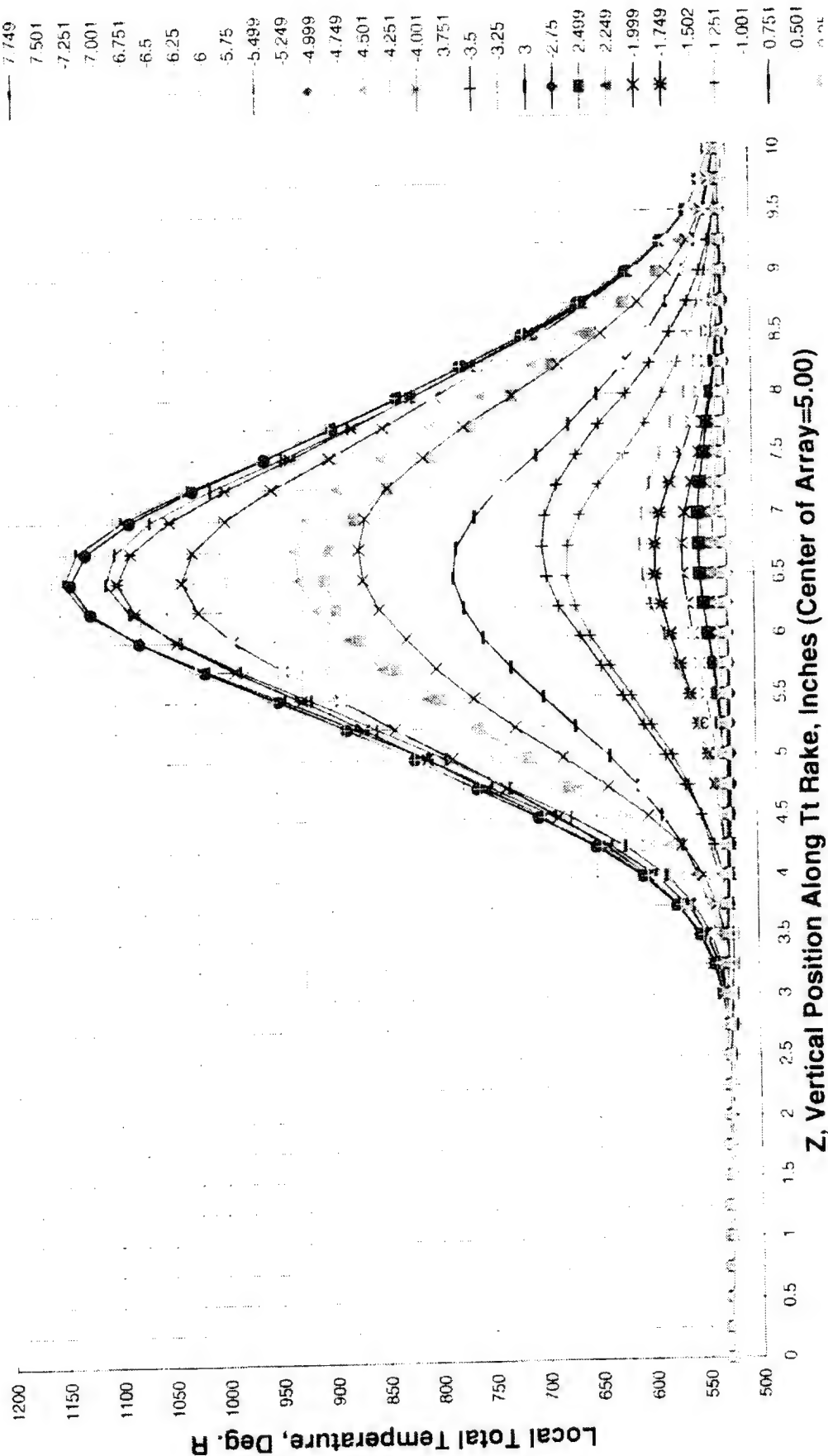




Figure 32(a). 12L Baseline (12CL) Mixer Total Temperature Survey at  $x/D=0.1$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt(core/tt)fan, 0.1 Mn)FS, Tt)max=1230R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests, RDG # T355

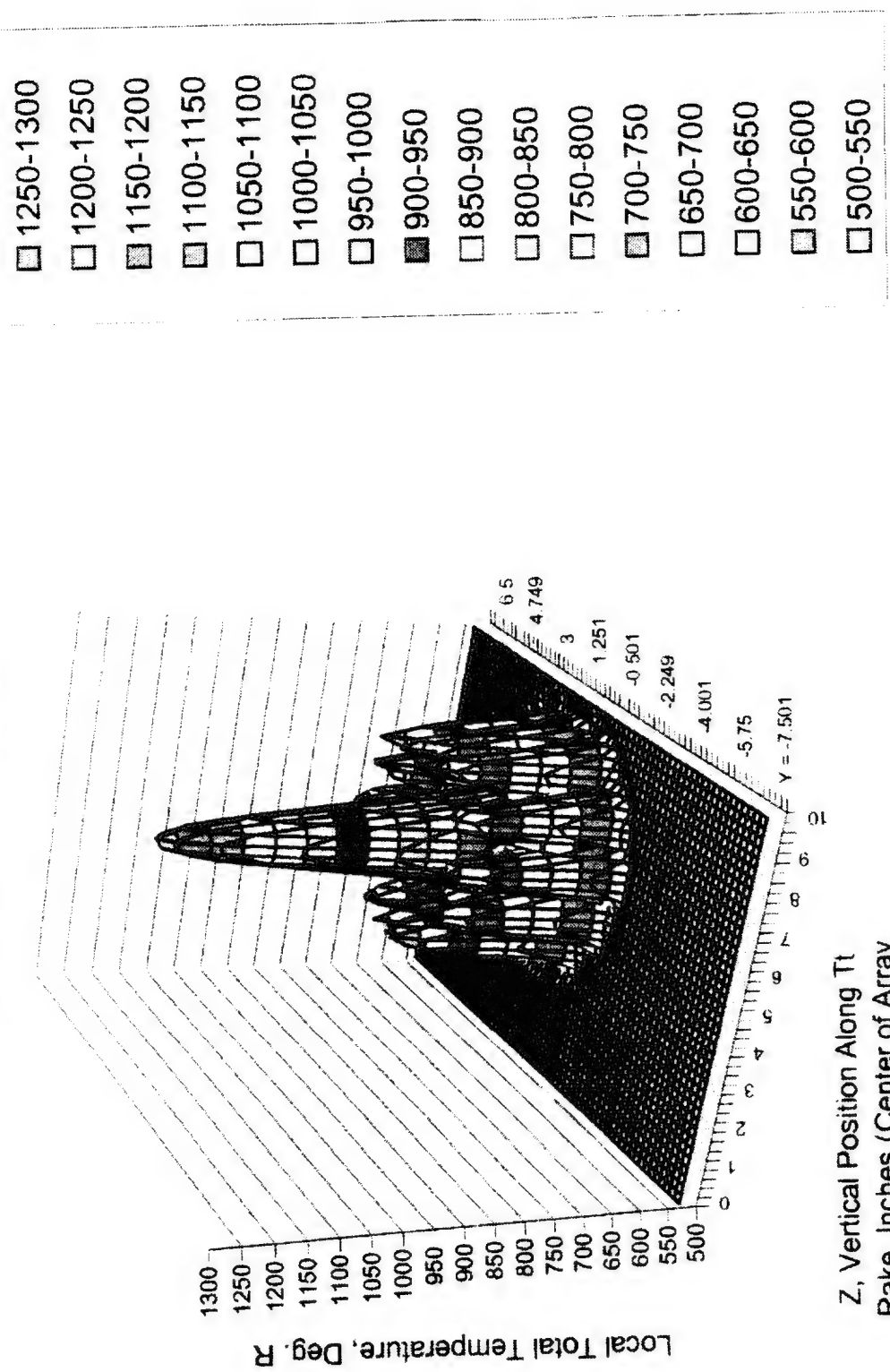




FIGURE 32 (b)

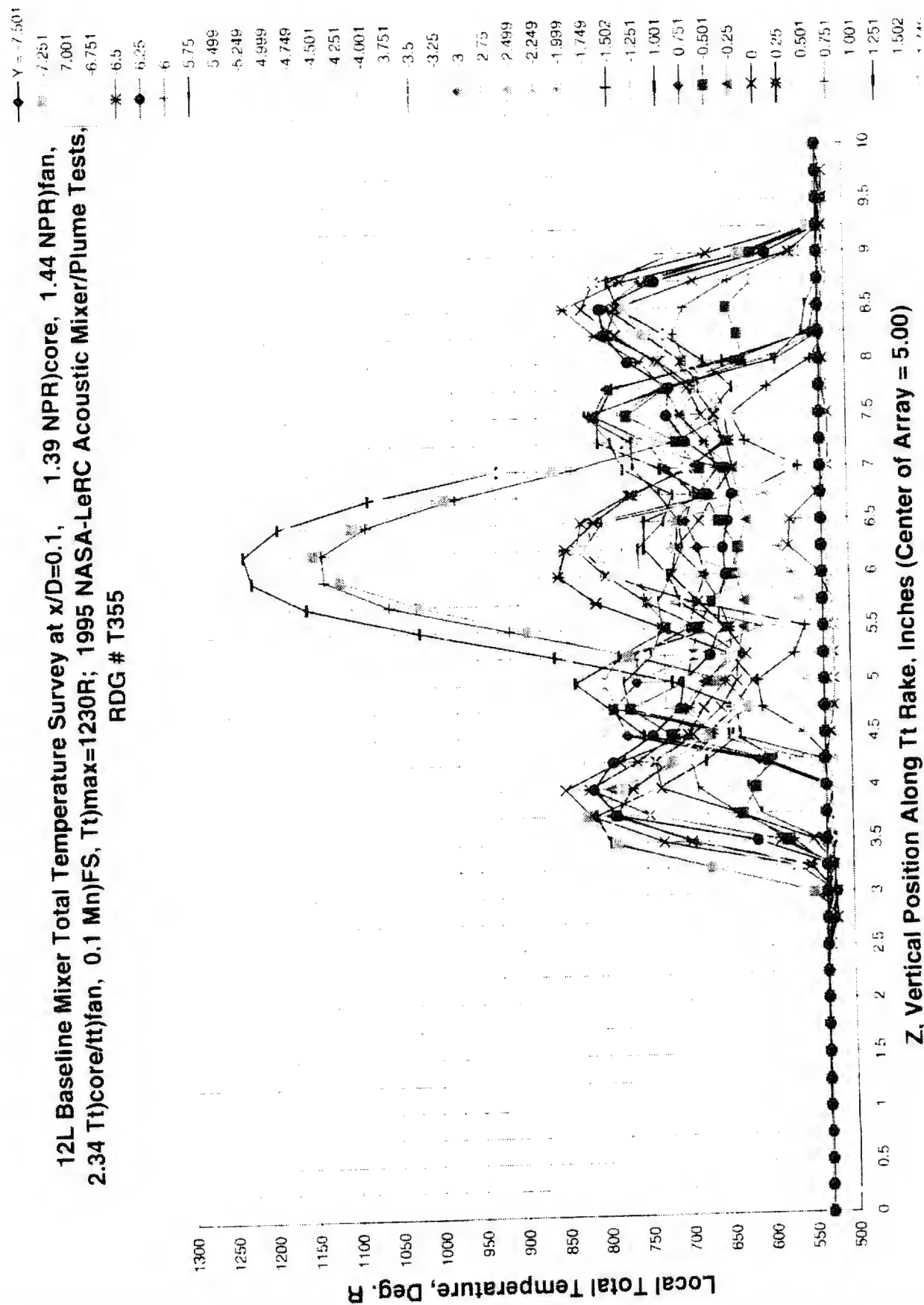




Figure 33(a). 12L Baseline (12CL) Mixer Total Temperature Survey at  $x/D=0.5$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.3 Mn)FS, Tt)max = 1210R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # T361

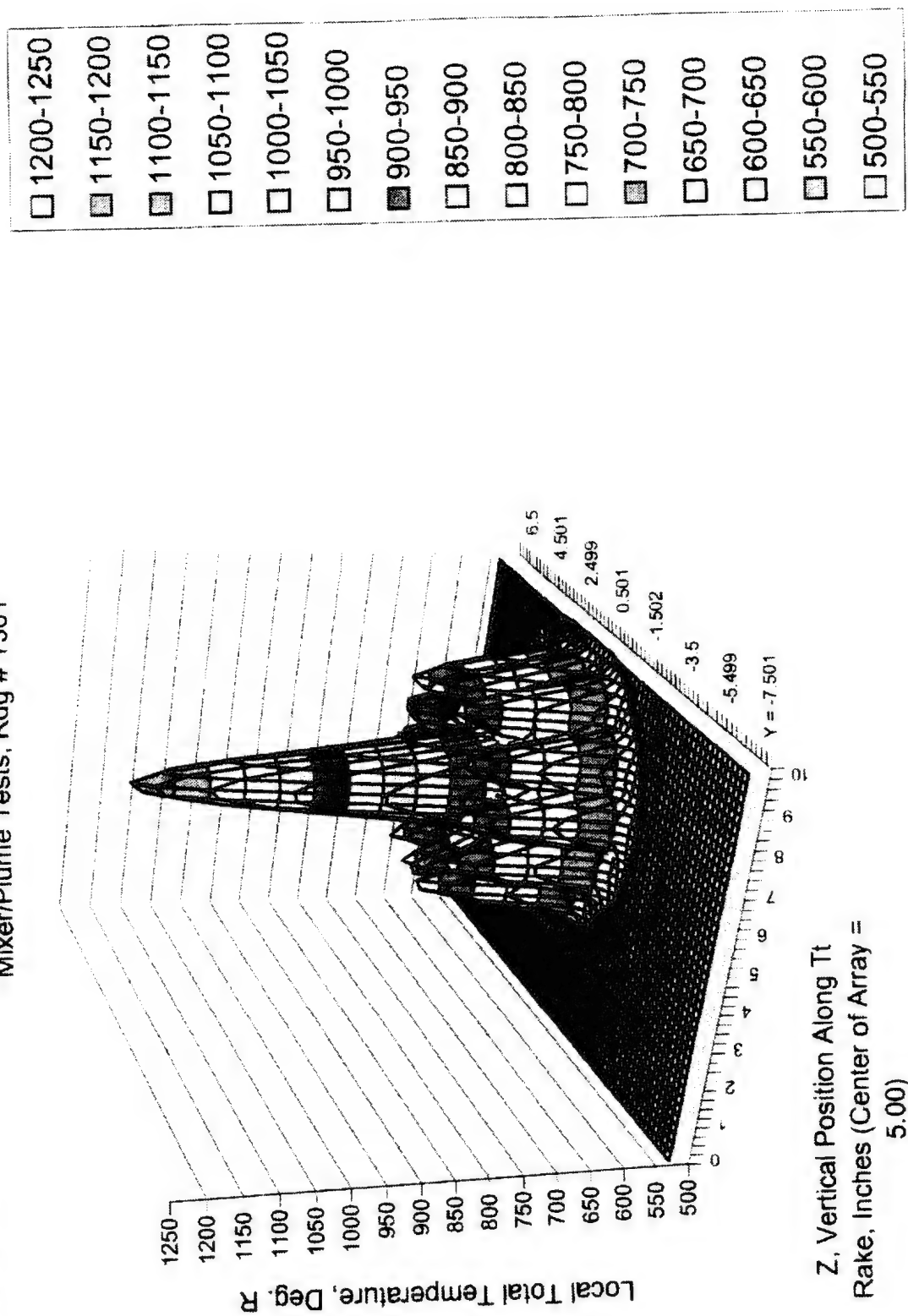




FIGURE 33 (b)

12L Baseline Mixer Total Temperature Survey at  $x/D=0.5$ , 1.39 NPR)core, 1.44 NPR)fan,  
 2.34 Tt)core/Tt)fan, 0.3 Mn)FS, Tt)max = 1210R; 1995 NASA-LeRC Acoustic Mixer/Plume  
 Tests, Rtdg # T361

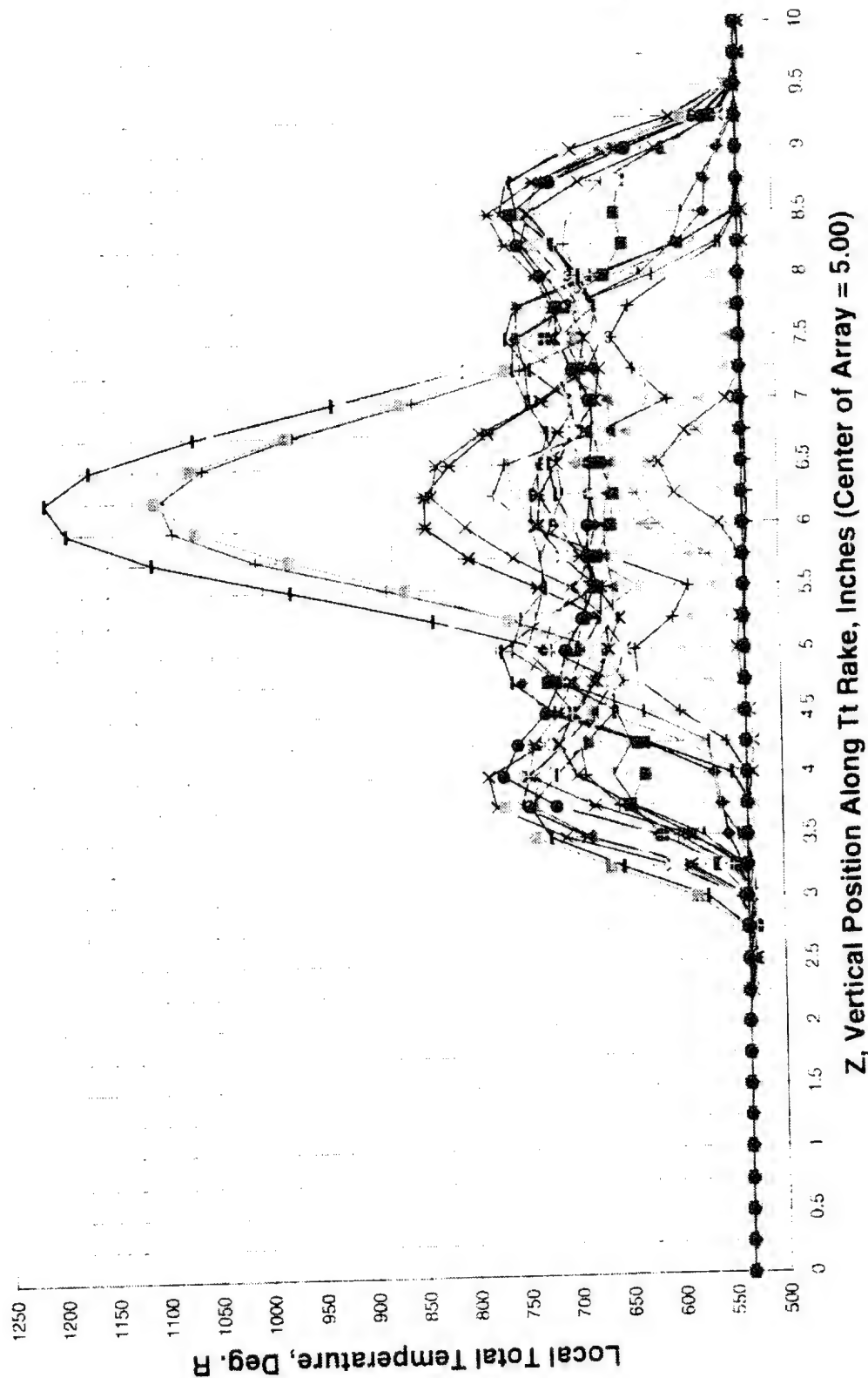




Figure 34(a). 12L Baseline (12CL) Mixer Total Temperature Survey at  $x/D=1.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1 Mn)FS, Tt)max = 1149R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # T365

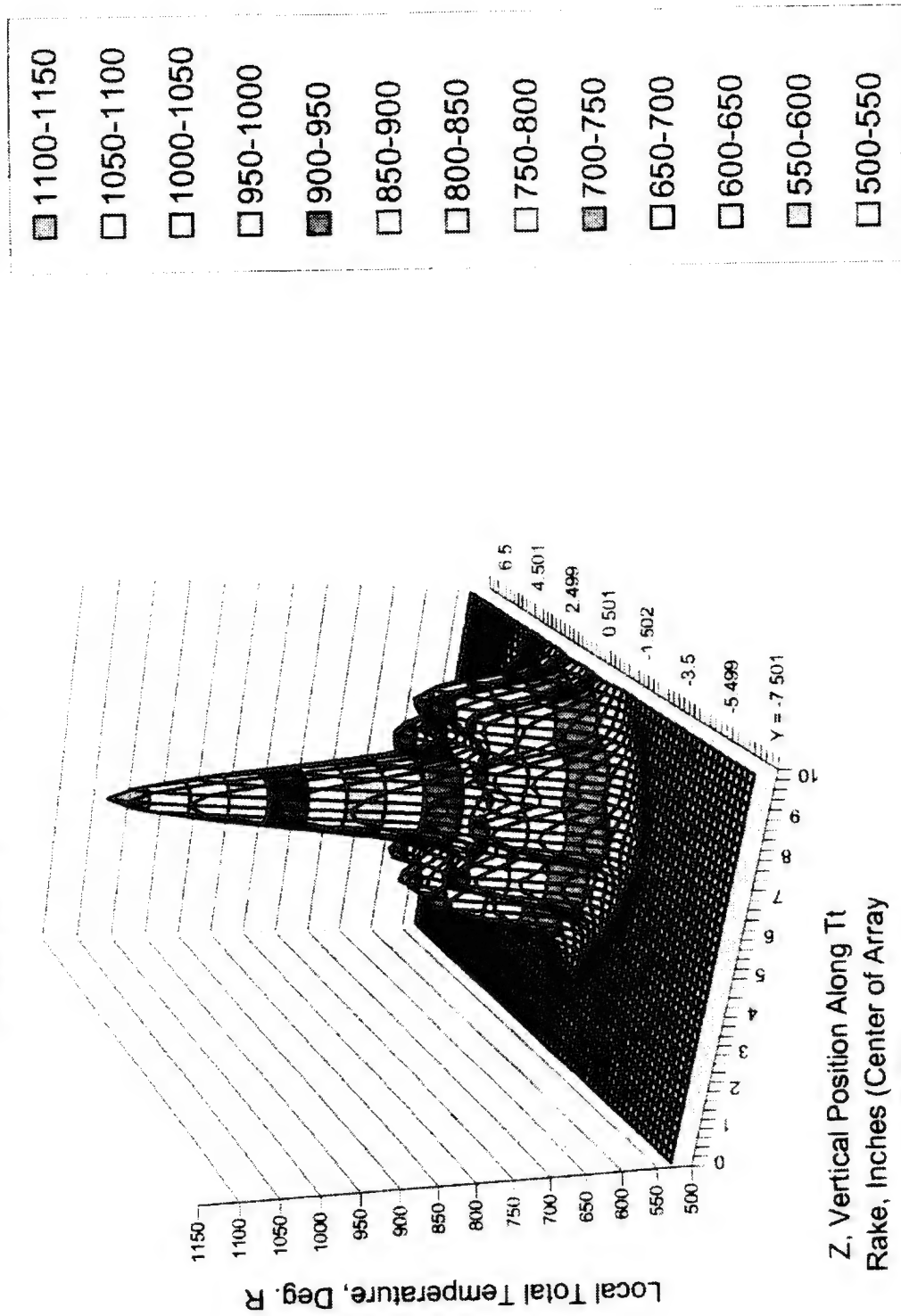




FIGURE 34 (b)

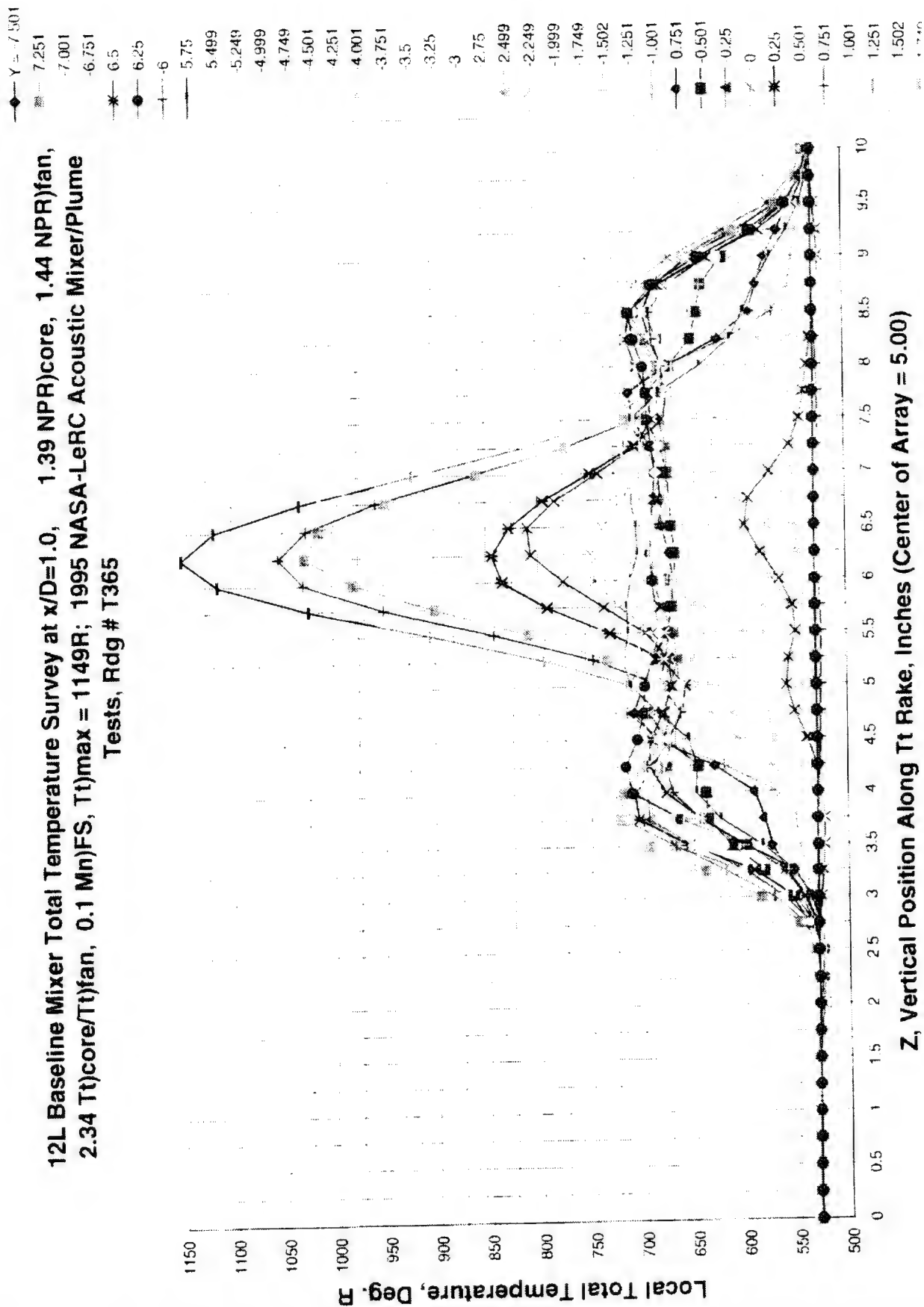




Figure 35(a). 12L Baseline (12CL) Mixer Total Temperature Survey at  $x/D=4.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1 Mn)FS, Tt)max = 866R; 1995 NASA-LeRC Acoustic Mixer/PLume Tests, Rdg # T367

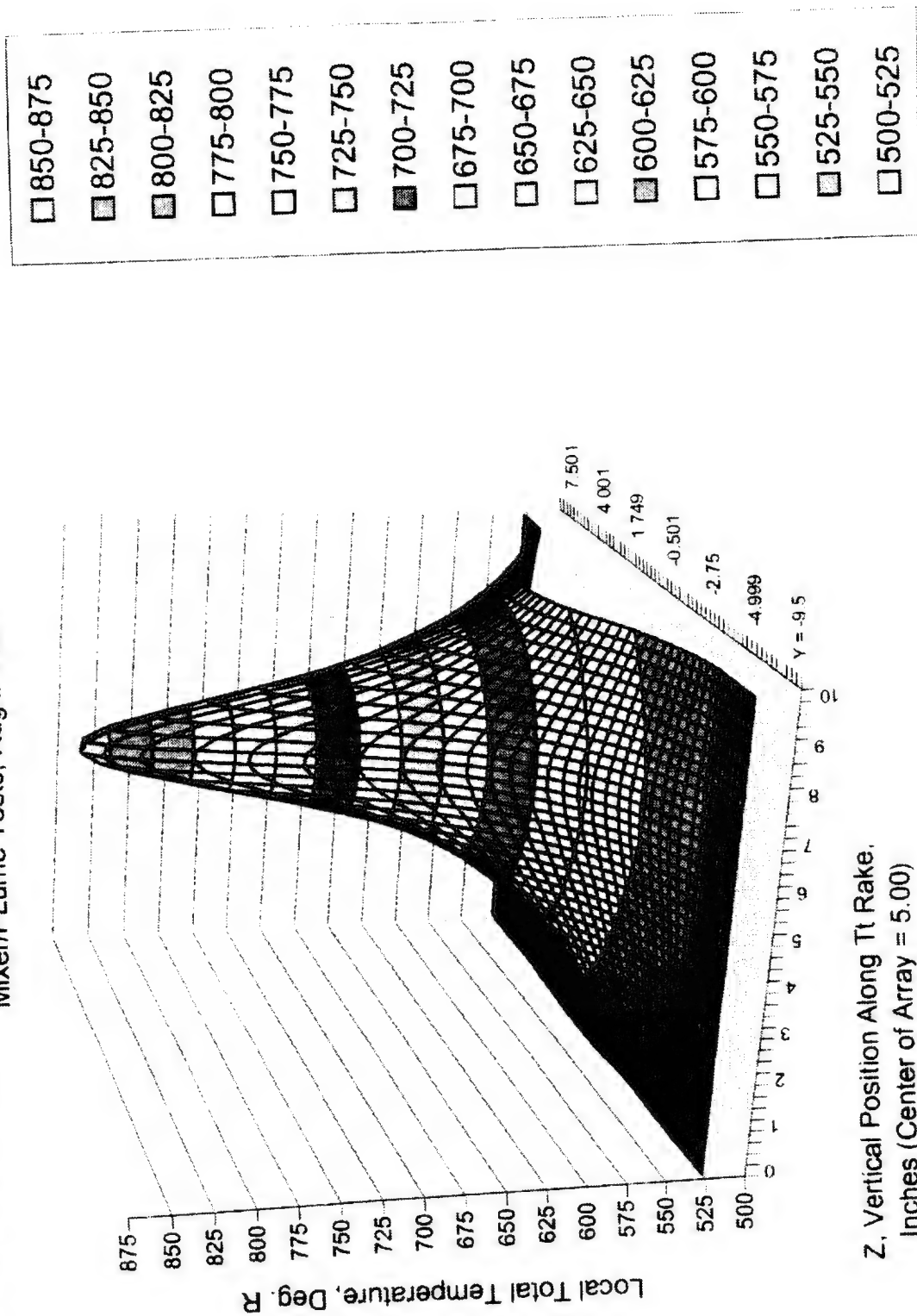




FIGURE 35 (b)

12L Baseline Mixer Total Temperature Survey at  $x/D=4.0$ , 1.39 NPR)core, 1.44 NPR)fan,  
 2.34 Tt)core/Tt)fan, 0.1 Mn)FS, Tt)max = 866R; 1995 NASA-LeRC Acoustic Mixer/PLume  
 Tests, Rldg # T367

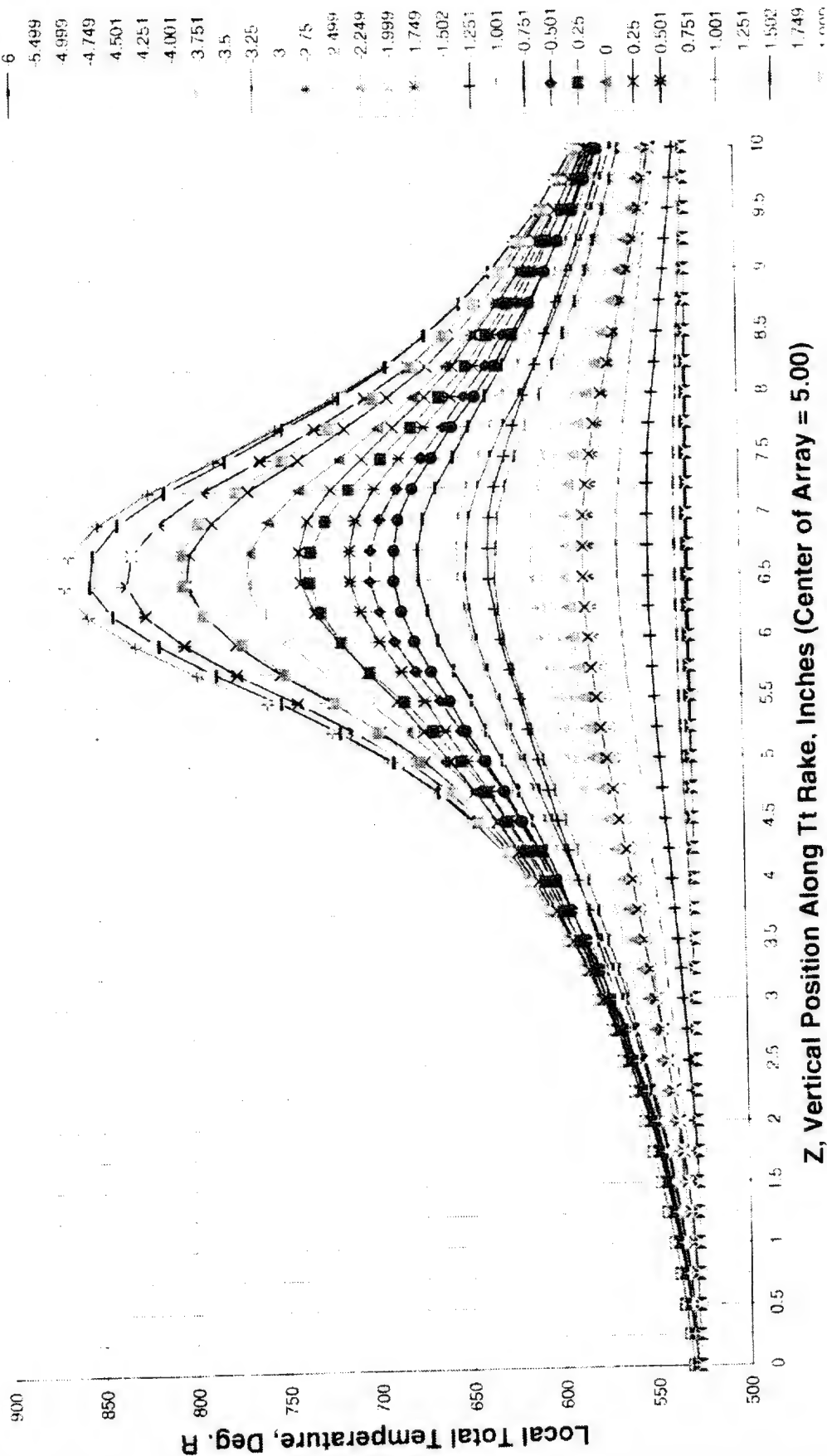




FIGURE 36

12L Baseline Mixer Total Temperature Survey at  $x/D=0.5$ , 1.39 NPR)core, 1.44 NPR)fan, 2.37 Tt)core/Tt)fan, 0.2 MN(FS; 1996-97 NASA LeRC Acoustic Mixer/Plume Tests - Rdg # TT564

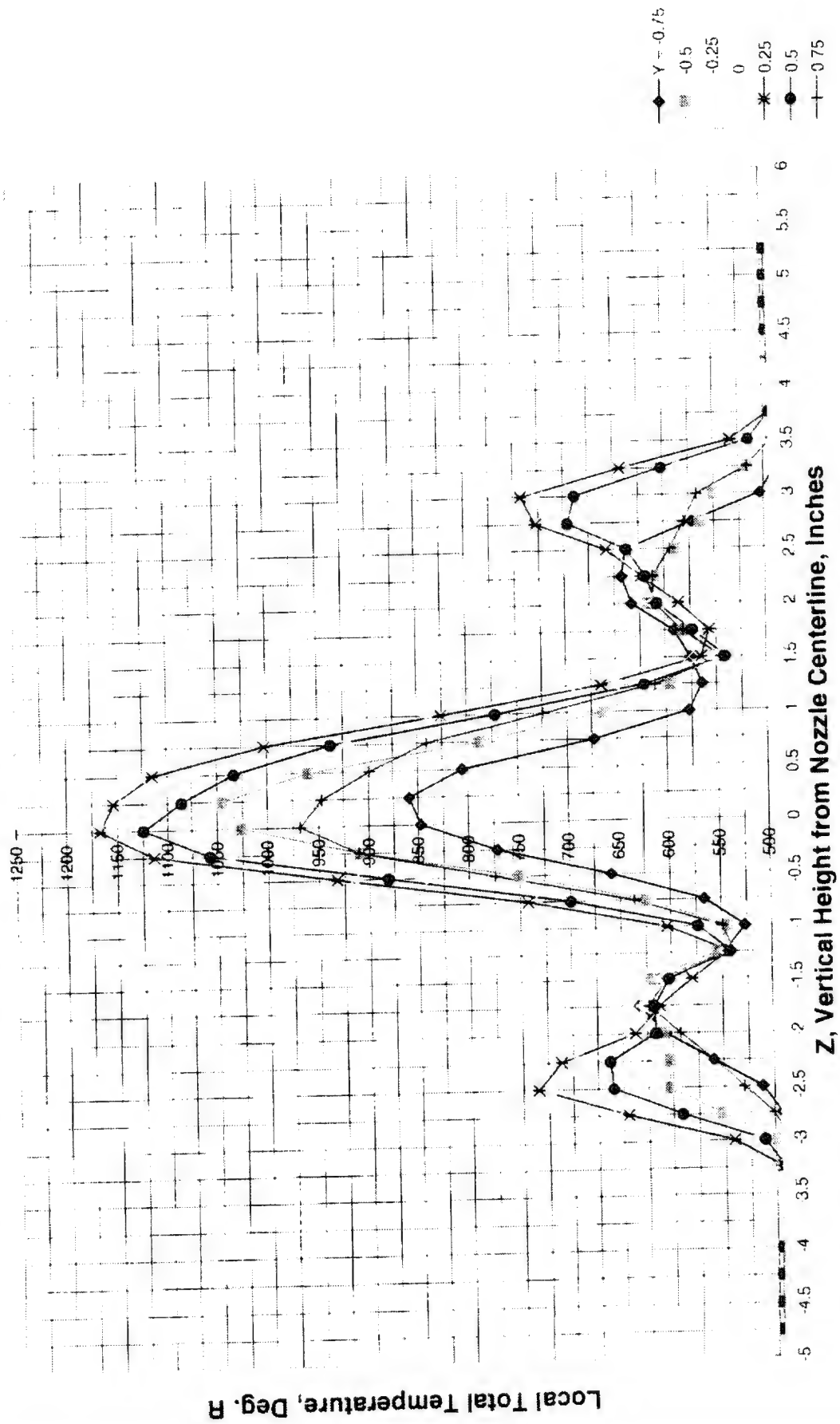




Figure 37(a). 12L Advanced Mixer (12UH) Total Temperature Survey at  $x/D=0.1$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1 Mn)FS; Tt)max = 1145R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # T409

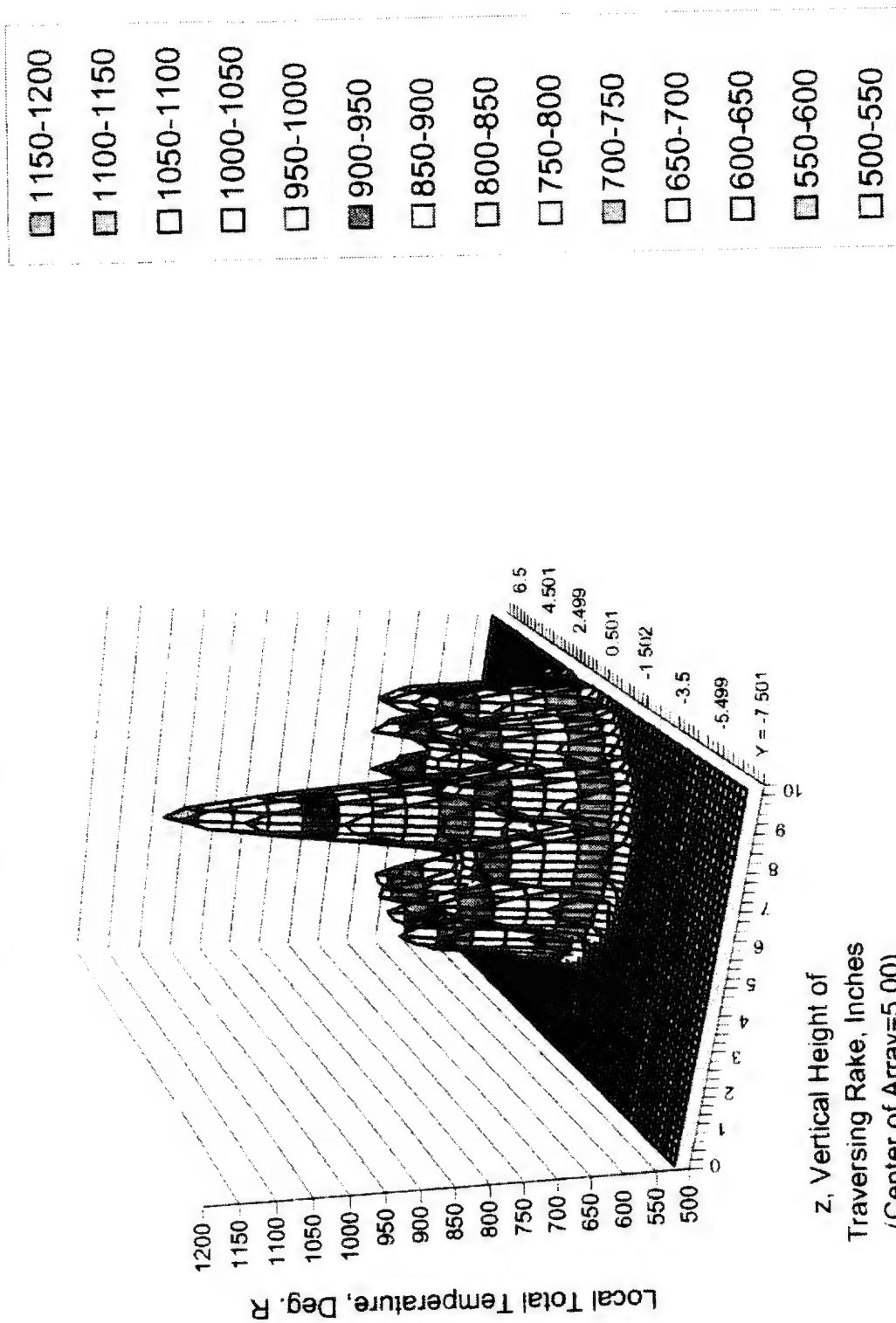
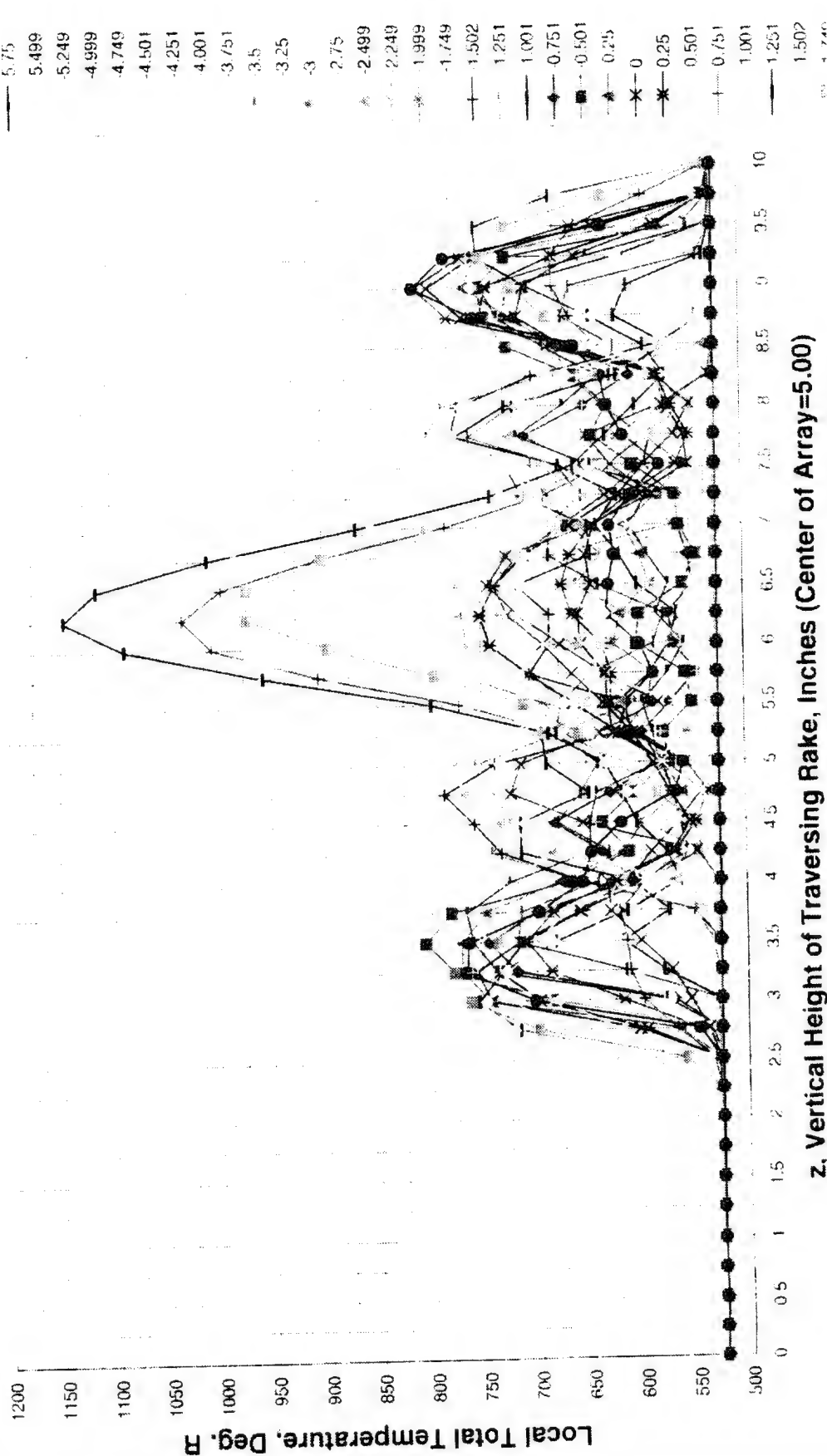




FIGURE 37(b)

12L Advanced Mixer Total Temperature Survey at  $x/D=0.1$ , 1.39 NPR)core, 1.44 NPR)fan,  
 2.34 Tt)core/Tt)fan, 0.1 Mn)FS; Tt)max = 1145R; 1995 NASA-LeRC Acoustic Mixer/Plume  
 Tests Rtdg # T409





Mixer/Plume Testing Rdg # T410





FIGURE 38 (b)

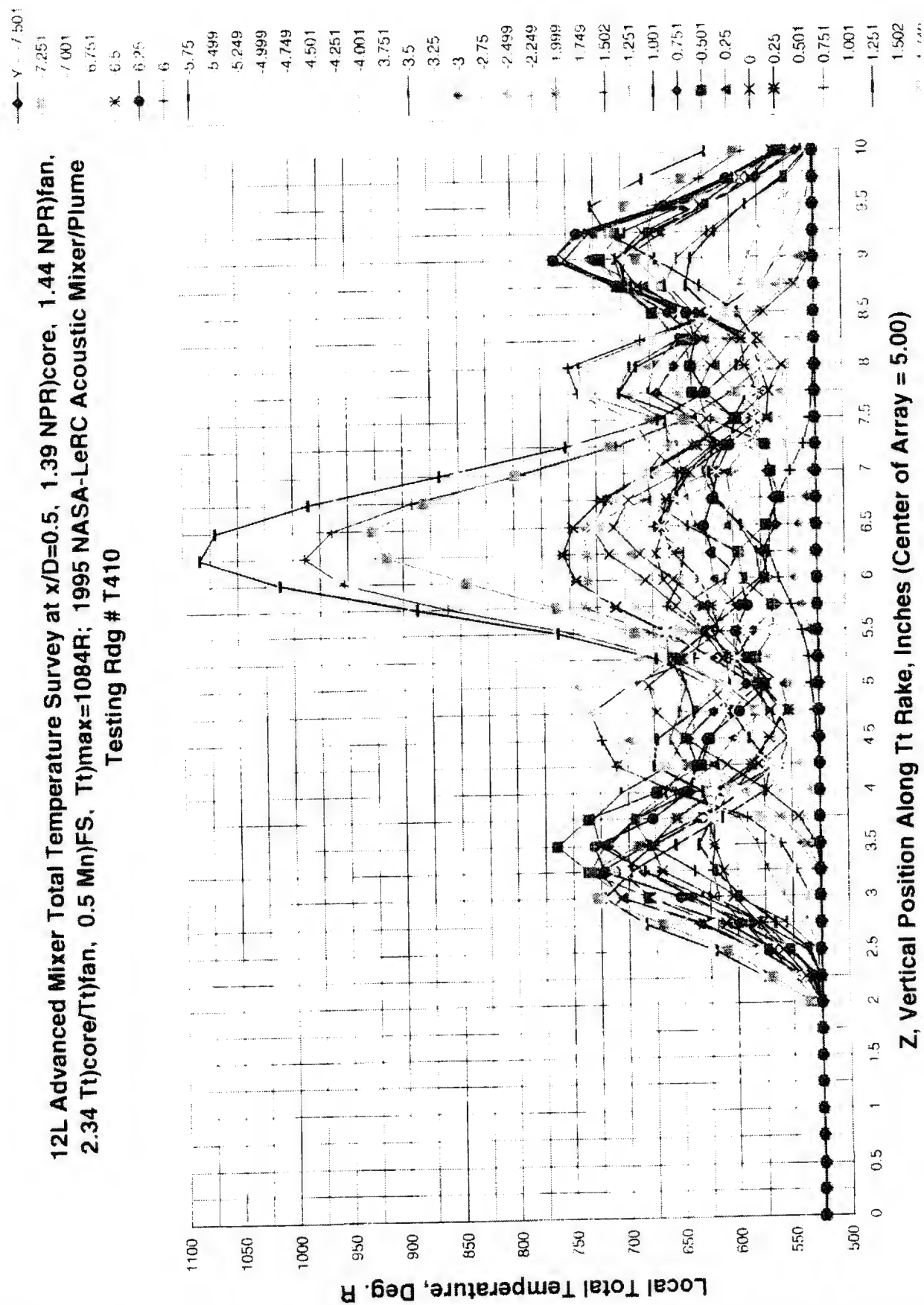
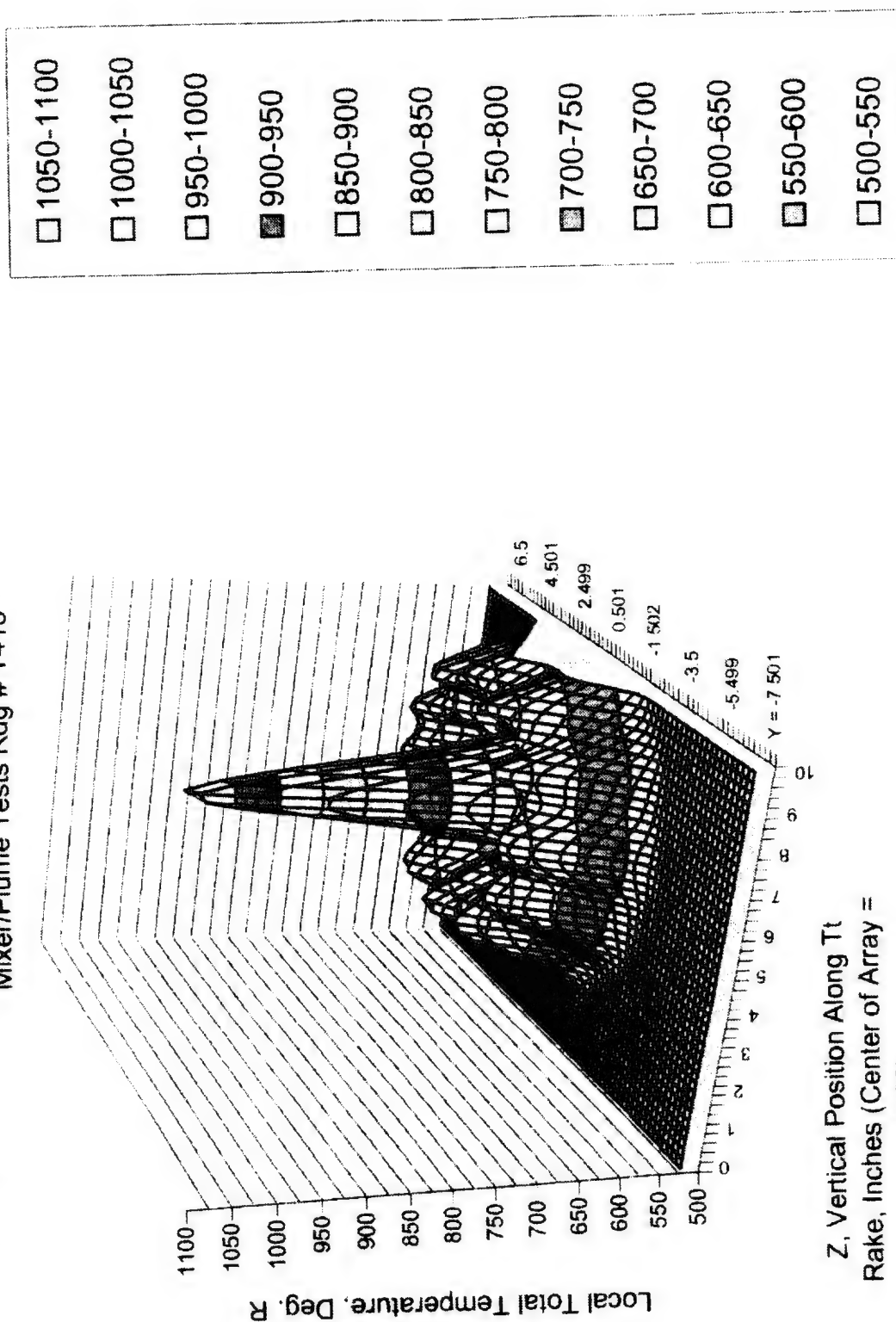




Figure 39(a). 12L Advanced Mixer (12UH) Total Temperature Survey at  $x/D=1.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1Mn)FS, Tt)max=1007R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # T418





12L Advanced Mixer Total Temperature Survey at  $x/D=1.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1Mn)FS, Tt)max=1007R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests  
Rdg # T418

Local Total Temperature, Deg. R

Z, Vertical Position Along Tt Rake, Inches (Center of Array = 5.00)

Legend:

- Y = 7.500
- 7.251
- 7.001
- 6.751
- 6.5
- 6.25
- 6
- 5.75
- 5.499
- 5.249
- 4.999
- 4.749
- 4.501
- 4.251
- 4.001
- 3.751
- 3.5
- 3.25
- 3
- 2.75
- 2.499
- 2.249
- 1.999
- 1.749
- 1.502
- 1.251
- 1.001
- 0.751
- 0.501
- 0.25
- 0
- 0.25
- 0.501
- 0.751
- 1.001
- 1.251
- 1.502
- 1.749
- 1.999
- 2.249
- 2.499
- 2.75
- 3
- 3.25
- 3.5



Figure 40(a). 12L Advanced Mixer (12UH) Total Temperature Survey at  $x/D=4.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1 Mn)FS; Tt)max = 785R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # T420

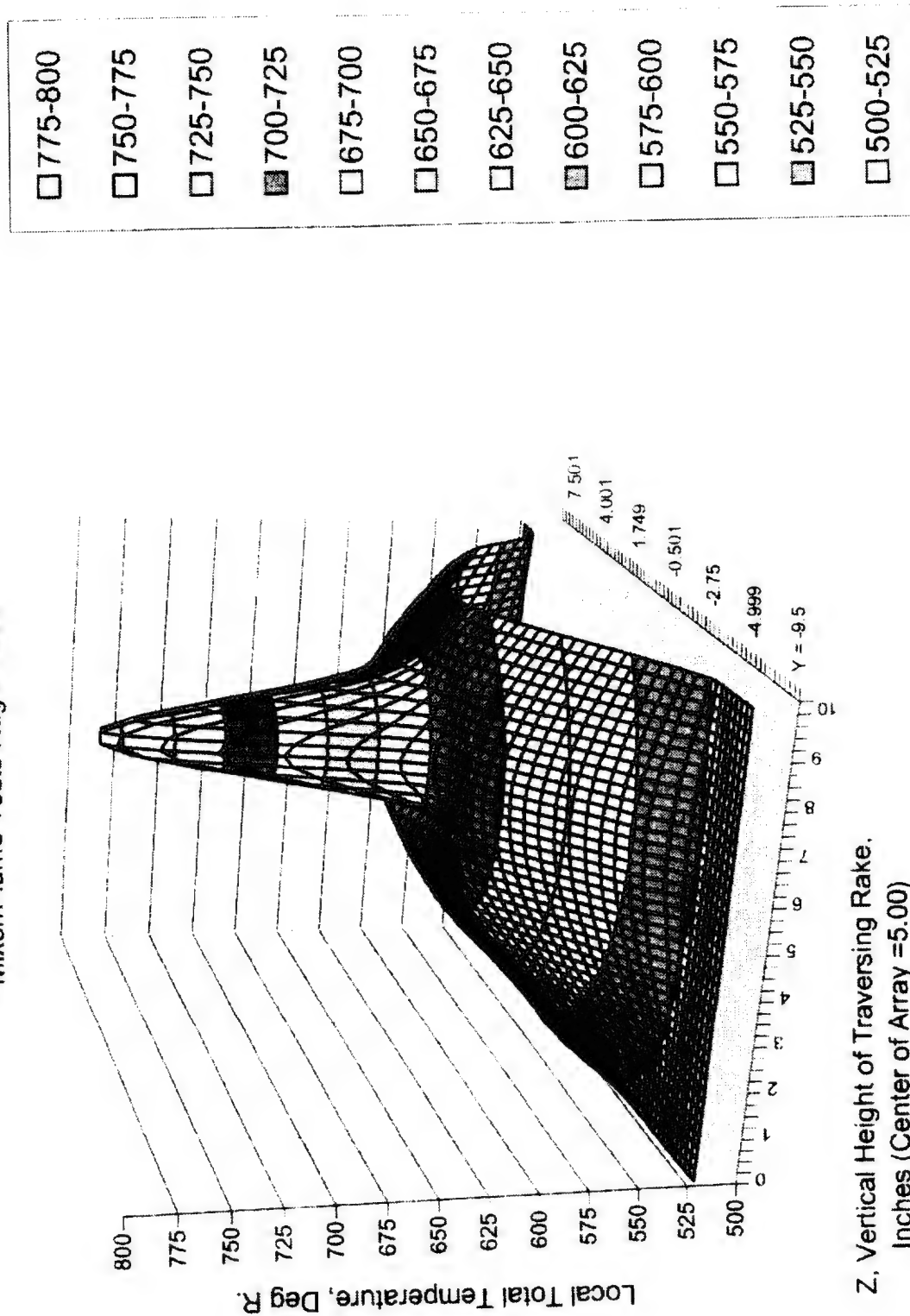




FIGURE 40 (b)

12L Advanced Mixer Total Temperature Survey at  $x/D=4.0$ , 1.39 NPR)core, 1.44 NPR)fan,  
2.34 Tt)core/Tt)fan, 0.1 Mn)FS; Tt)max = 785R; 1995 NASA-LeRC Acoustic Mixer/Plume  
Tests Rdg # T420

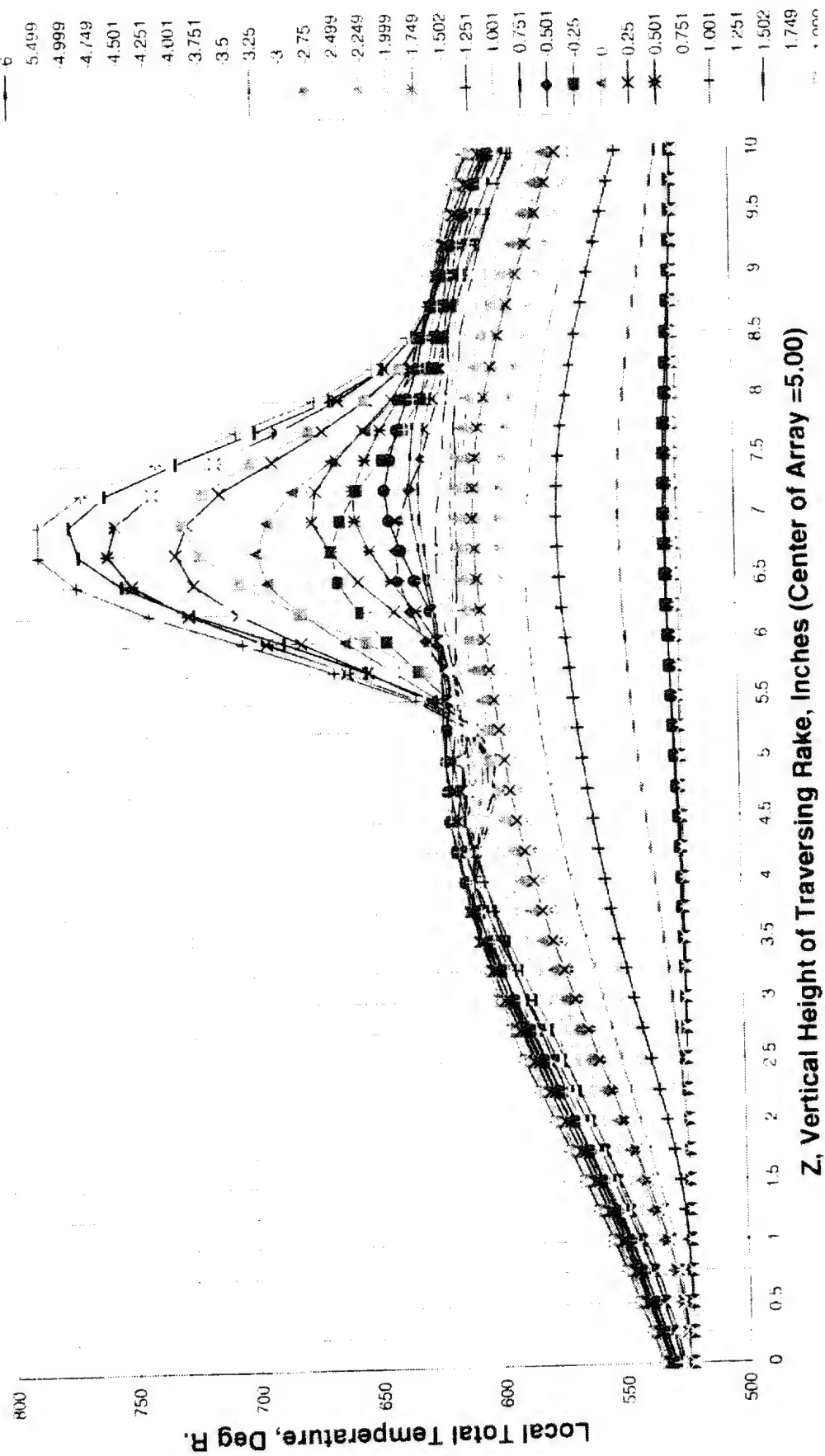
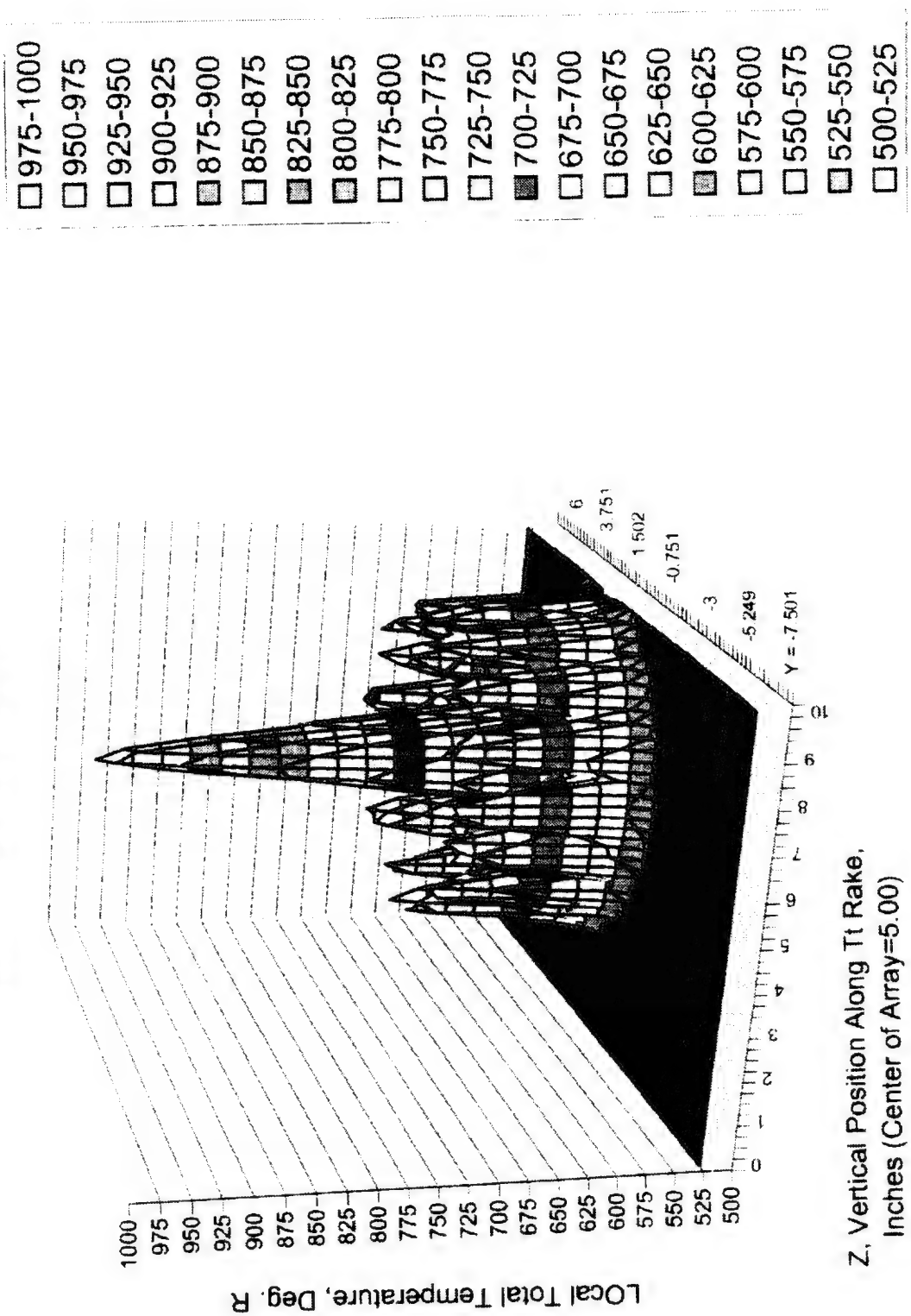




Figure 41(a). 16L Acoustic Mixer (16UH) Total Temperature Survey at  $x/D=0.1$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1 Mn)FS, Tt)max = 981R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # T378



Z, Vertical Position Along Tt Rake,  
Inches (Center of Array=5.00)



FIGURE 41 (b)

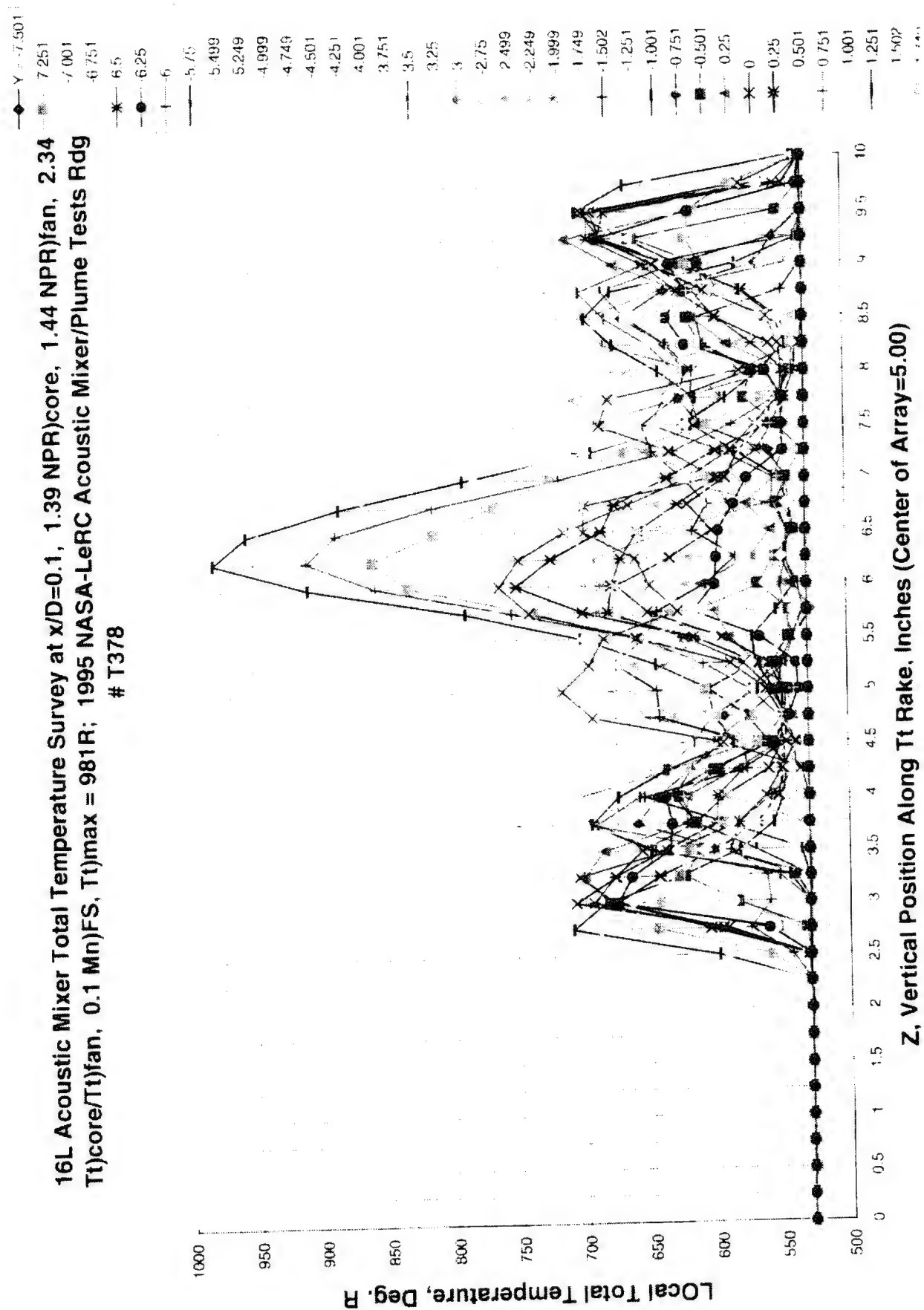




Figure 42(a). 16L Acoustic Mixer (16UH) Total Temperature Survey at  $x/D=0.5$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1 Mn)FS, Tt)max = 935R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # T380

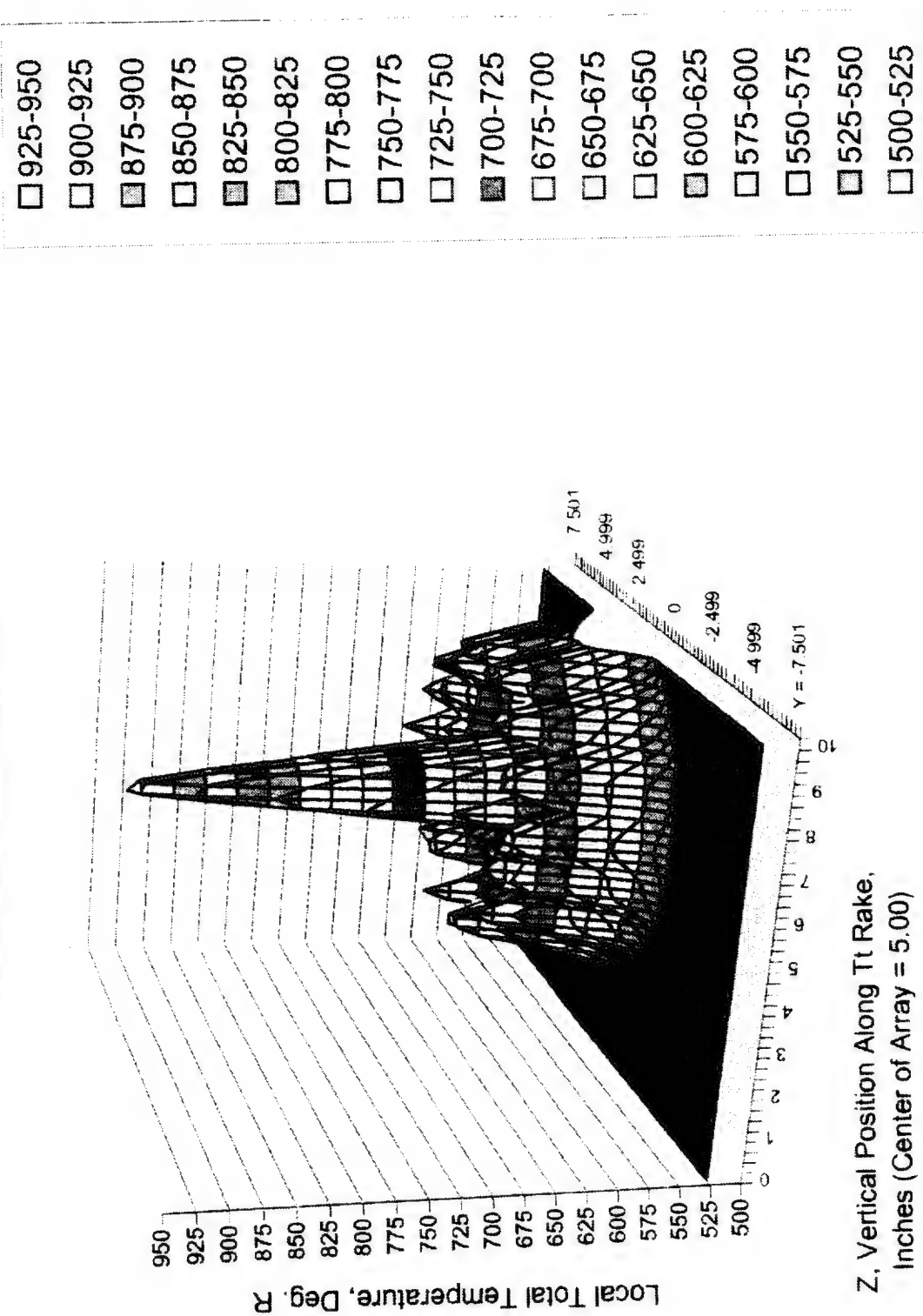




FIGURE 42 (b)

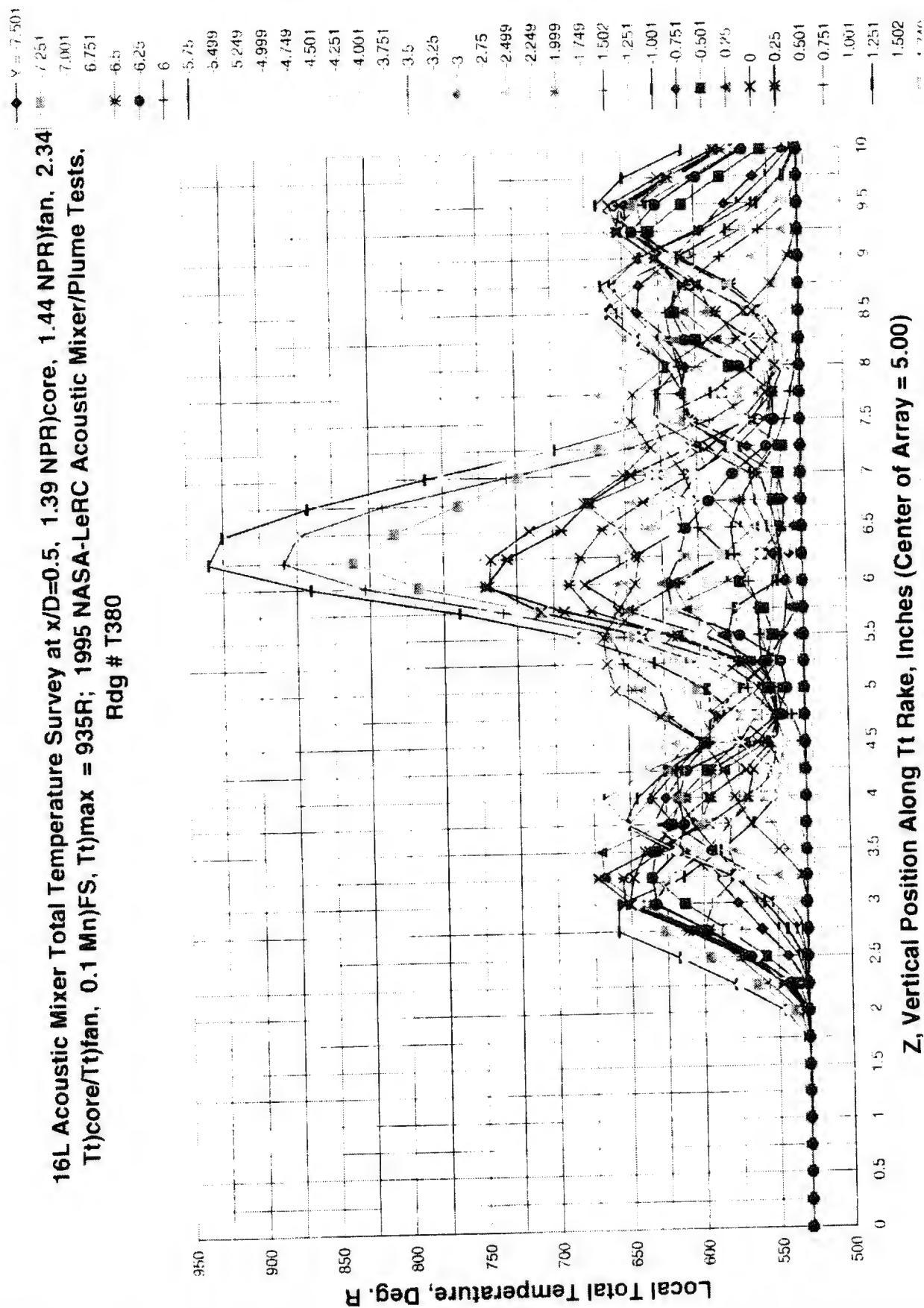




Figure 43(a). 16L Acoustic Mixer (16UH) Total Temperature Survey at  $x/D=1.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1 Mn)FS, Tt)Max=897R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests, Rdg # T388

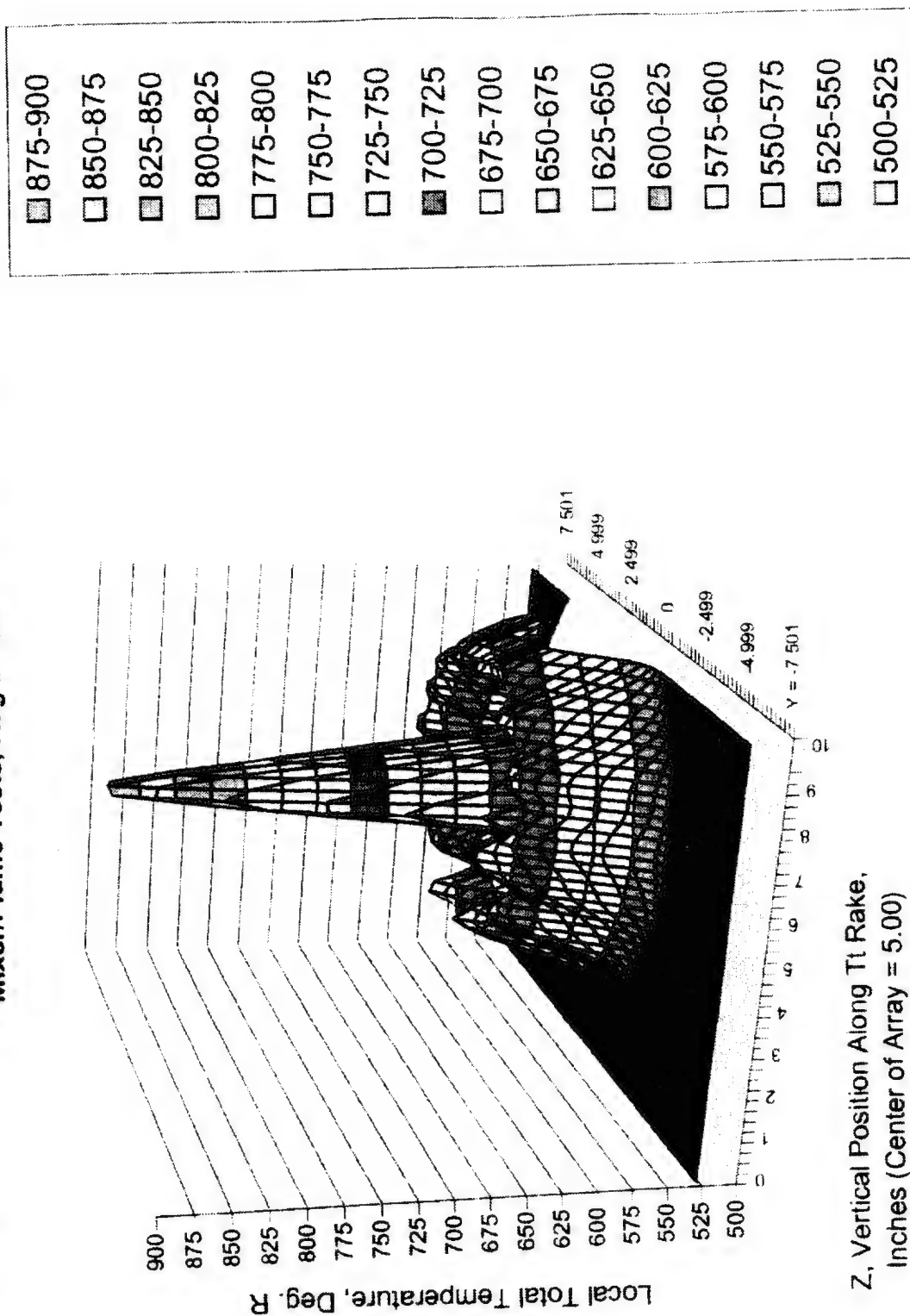




FIGURE 43(b)

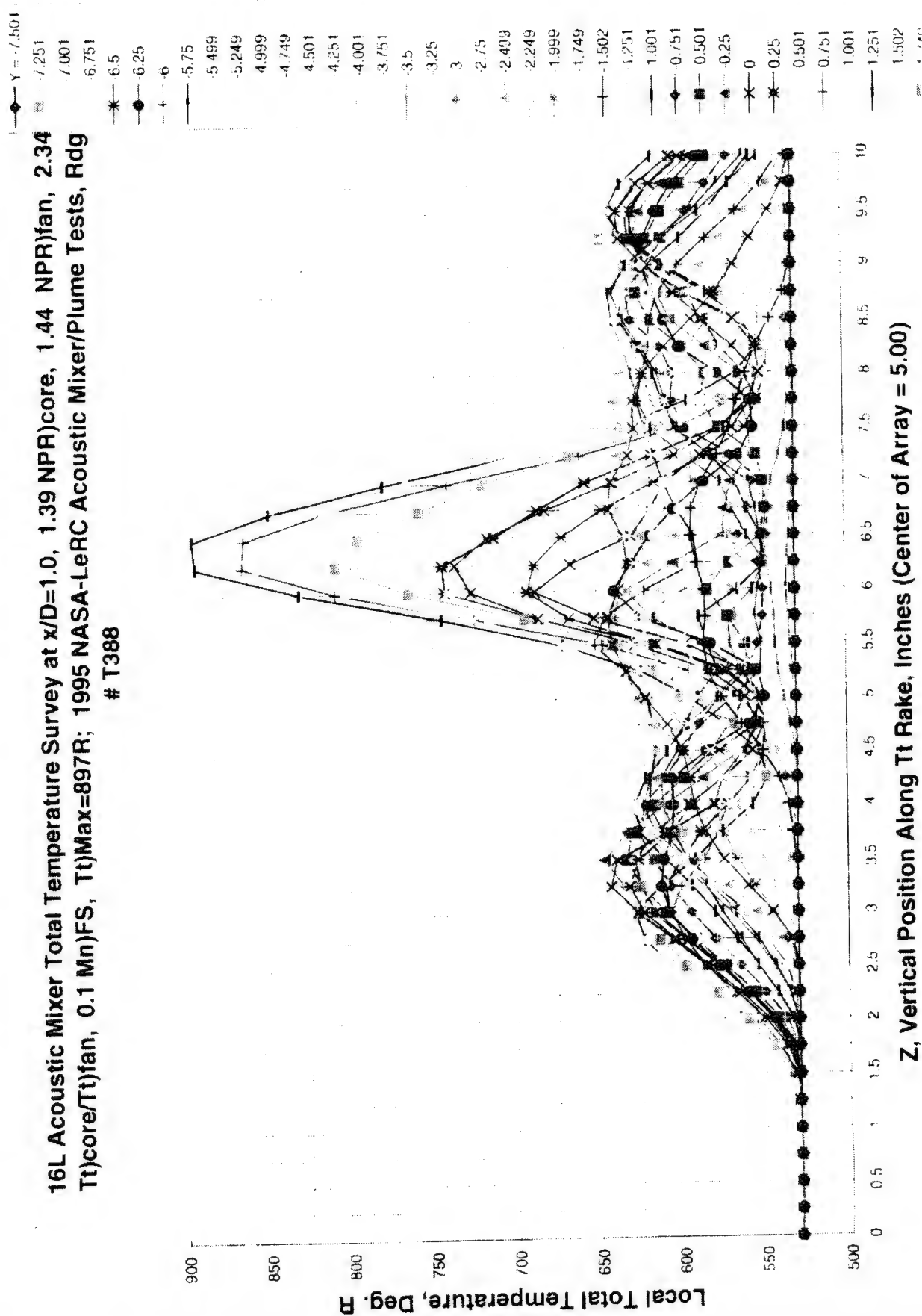




Figure 44(a). 16L Acoustic Mixer (16UH) Total Temperature Survey at  $x/D=4.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1 Mn)FS, Tt)max = 754R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests Rdg # T389

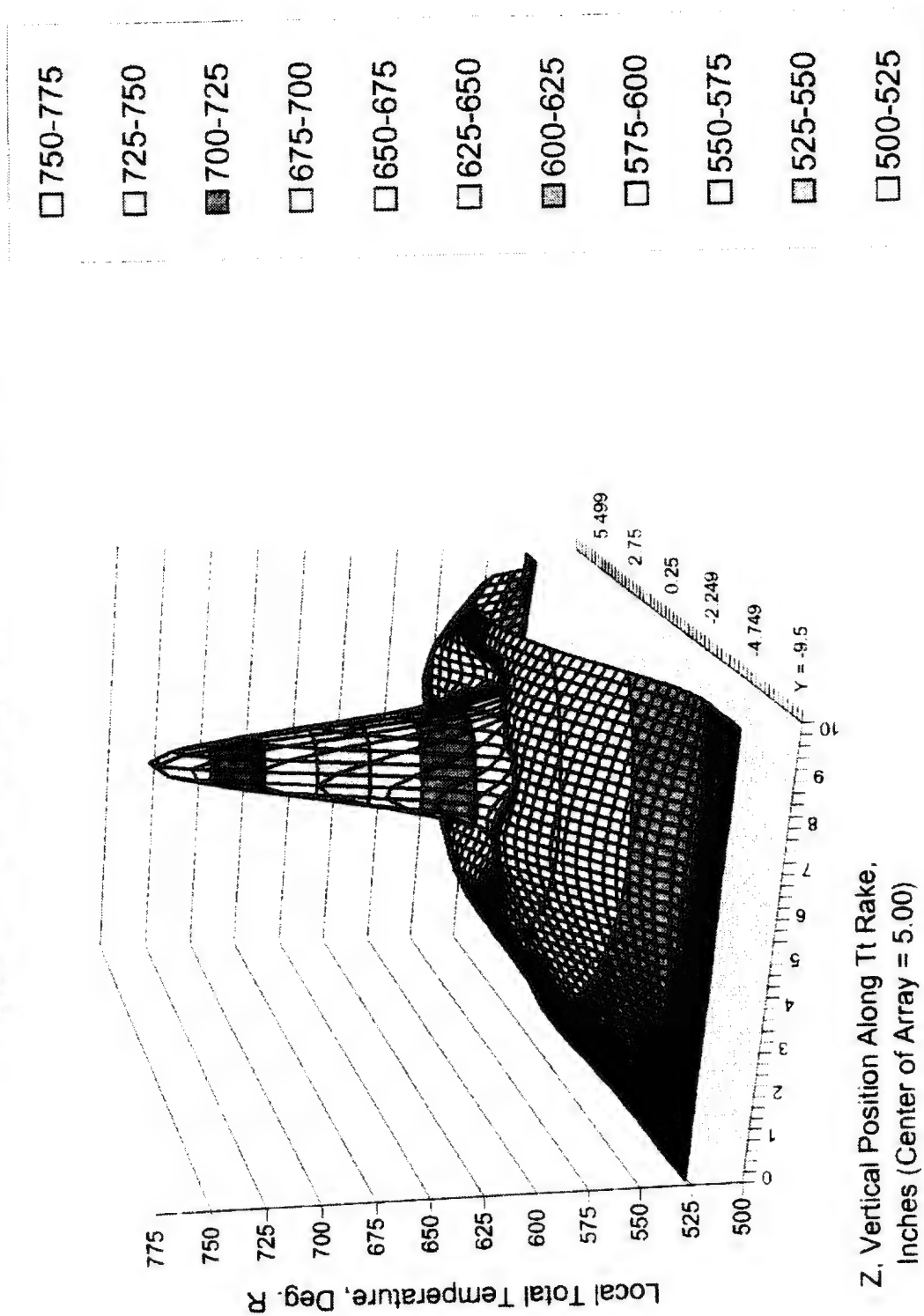




FIGURE 44 (b)

16L Acoustic Mixer Total Temperature Survey at  $x/D=4.0$ , 1.39 NPR)core, 1.44 NPR)fan, 2.34 Tt)core/Tt)fan, 0.1 Mn)FS, Tt)max = 754R; 1995 NASA-LeRC Acoustic Mixer/Plume Tests Rdbg # T389

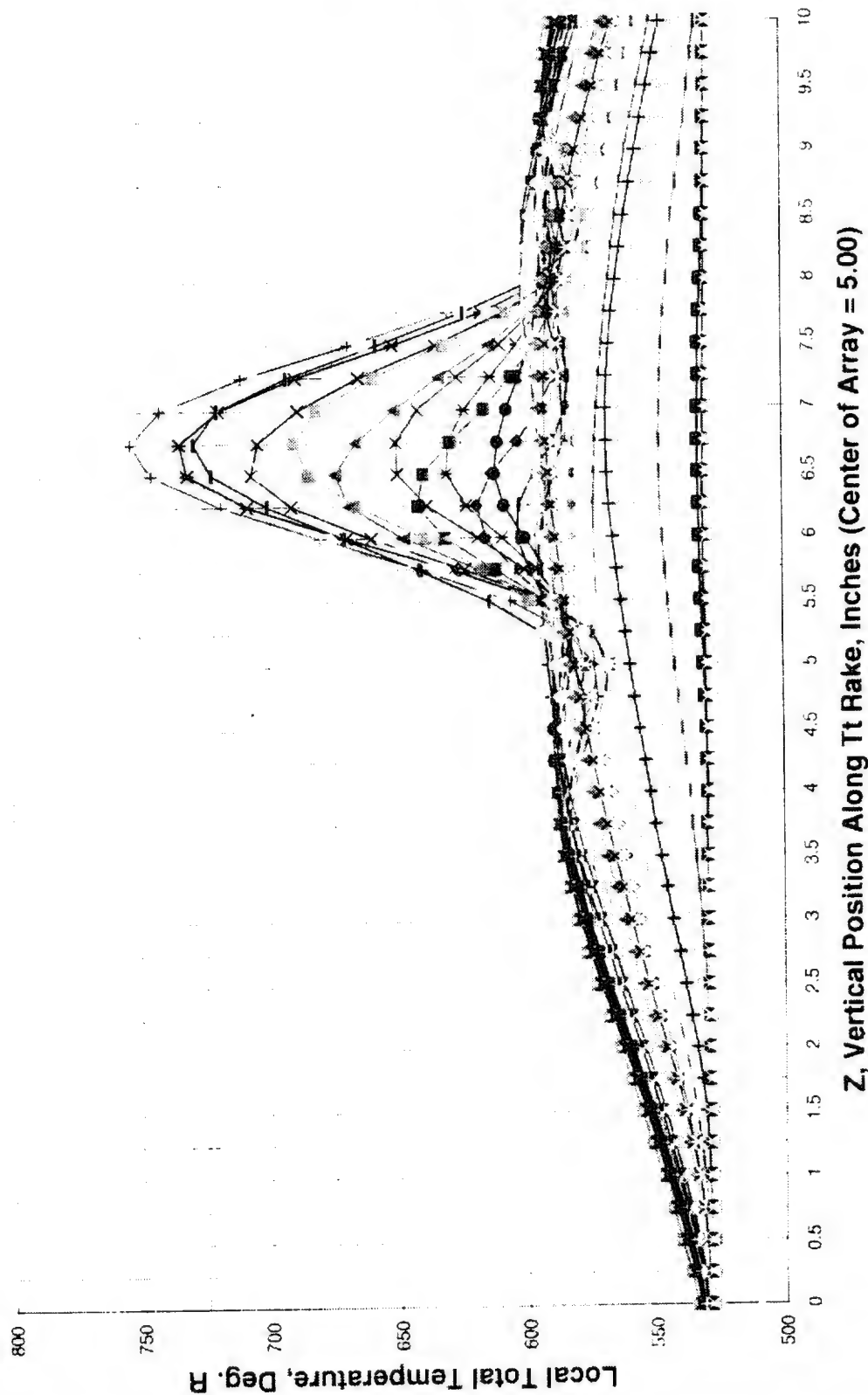
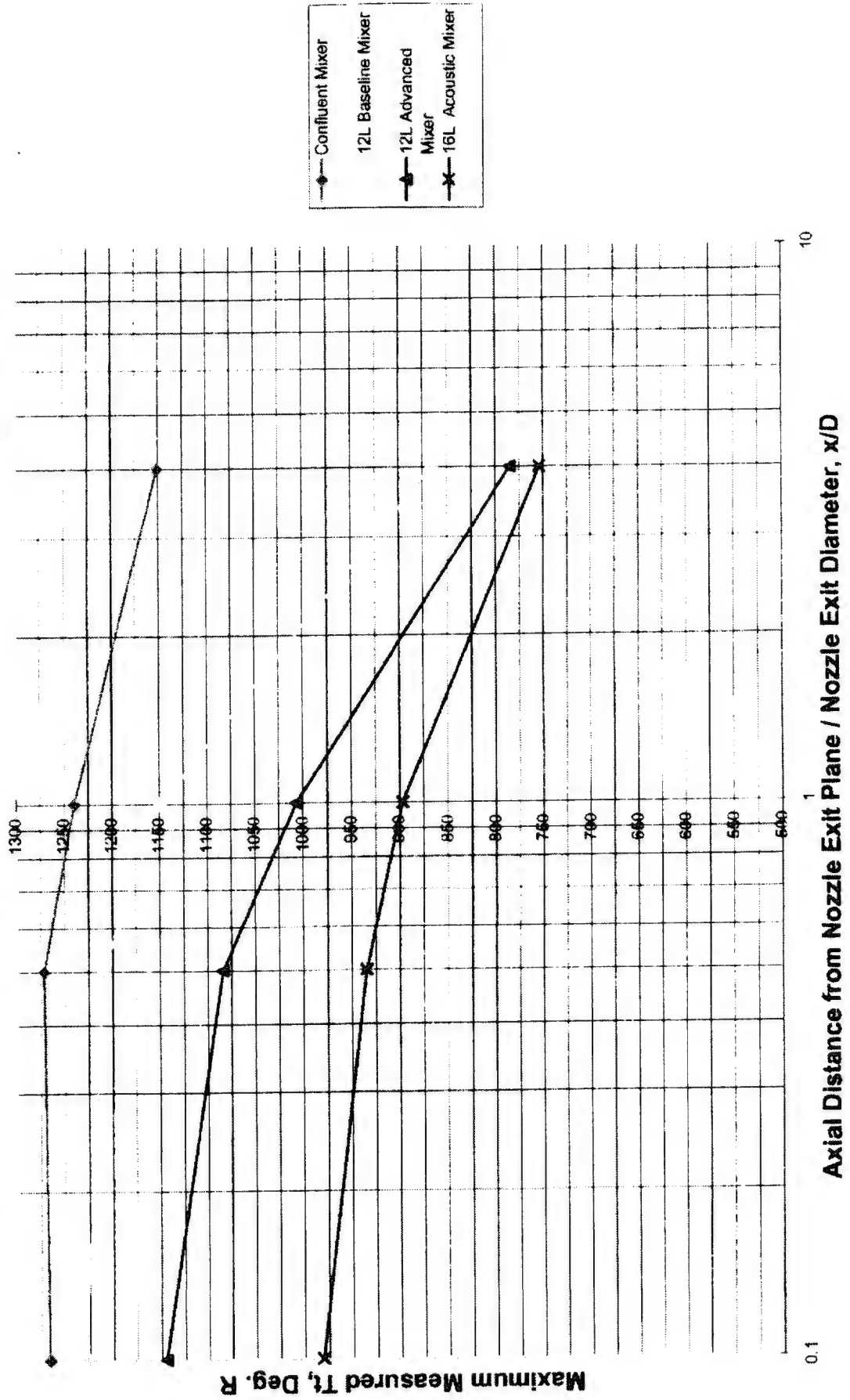




FIGURE 45

Maximum "Centerline" Total Temperature Decay for 1995 NASA LeRC Acoustic Mixers; 1.39 NPR/core, 1.44 NPR/fan, 2.37 Tt/core/Tt(fan, 0.1 Mn)FS









**Part 3**  
**Aerodynamic and Acoustic Data**







**Table 3.1 1996 NASA Acoustic Test Matrix**

**Reading Numbers**

100% L									
Condition*	M(fj)**	CONF*	12CL	12UH	12TH	16UH	20UH	20MH	20DH
A	0	287	415	138	386	101	443	337	233
B	0	288	416	139	387	102	442	338	234
C	0	290	417	140	388	103	441	339	235
D	0	291	418	141	389	104	440	341	236
E	0.2	295	423	145	385	108	436	345	240
F	0.2	294	421	144	384	107	437	344	239
G	0.2	293	422	143	383	106	438	343	238
H	0.2	292	419	142	382	105	439	342	237
I	0.3	296	424	146	375	109	435	346	241
J	0.3	297	425	147	379	111	434	347	242
K	0.3	298	427	148	380	112	433	348	243
L	0.3	299	428	149	381	113	432	349	244

75%L									
Condition*	M(fj)	CONF	12CL	12UH	12TH	16UH	20UH	20MH	20DH
A	0	-	-	-	-	-	-	-	-
B	0	-	-	-	469	-	468	-	456
C	0	-	-	-	470	-	467	-	455
D	0	-	-	-	471	-	466	-	454
E	0.2	-	-	-	-	-	-	-	-
F	0.2	-	-	-	474	-	465	-	453
G	0.2	-	-	-	473	-	464	-	452
H	0.2	-	-	-	472	-	463	-	450
I	0.3	-	-	-	-	-	-	-	-
J	0.3	-	-	-	475	-	460	-	447
K	0.3	-	-	-	476	-	461	-	448
L	0.3	-	-	-	477	-	462	-	449

50%L									
Condition*	M(fj)	CONF	12CL	12UH	12TH	16UH	20UH	20MH	20DH
A	0	-	269	213	396	120	318	356	250
B	0	-	270	214	397	121	319	357	251
C	0	-	271	215	398	122	320	358	252
D	0	-	272	216	399	123	321	359	253
E	0.2	-	276	220	403	127	325	363	258
F	0.2	-	275	219	402	126	324	362	257
G	0.2	-	274	218	401	125	323	361	255
H	0.2	-	273	217	400	124	322	360	254
I	0.3	-	277	221	404	128	326	365	259
J	0.3	-	278	222	405	129	327	366	260
K	0.3	-	279	223	406	130	328	367	261
L	0.3	-	280	224	407	131	329	368	262

\* See Table 3.2 (next) for explanation of operating conditions A - L \*\* M(fj) = Free-jet Mach number

# See Table 3.3 for mixer-code nomenclature



**Table 3.2 1996 NASA Acoustic Test Matrix****Nominal Operating Conditions**

Condition	NPR(fan)	NPR(core)	TTR
A, E, I	1.21	1.17	2.21
B, F, J	1.44	1.39	2.34
C, G, K	1.61	1.54	2.62
D, H, L	1.82	1.74	2.79

**Table 3.3 Mixer-Code Nomenclature**

Mixer Code	Mixer Description
CONF	Confluent
12CL	12-lobe with cut-outs & low penetration
12UH	12-lobe unscalped & high penetration
12TH	12-pair tongue mixer
16UH	16-lobe, unscalped & high penetration
20UH	20-lobe, unscalped & high penetration
20MH	20-lobe, moderately scalped & high penetration
20DH	20-lobe, deeply scalped & high penetration



## Nomenclature for Aerodynamic Data

NPRCA	Nozzle pressure ratio of core stream
WPACT	Mass flow rate of core stream (lb/s)
ATTCA	Total temperature of core stream ( $^{\circ}\text{R}$ )
APTCA	Total pressure of core stream (psia)
APSCA	Static pressure of core stream (psia)
NPRBA	Nozzle pressure ratio of bypass stream
WPABT	Mass flow rate of bypass stream (lb/s)
ATTBA	Total temperature of bypass stream ( $^{\circ}\text{R}$ )
APTBA	Total pressure of bypass stream (psia)
APSBA	Static pressure of bypass stream (psia)
RTTA	Total temperature ratio between core and bypass streams
AVMEX	Free-jet Mach number
PAMB	Ambient pressure (psia)
TA	Ambient temperature ( $^{\circ}\text{R}$ )
HUMIN	Ambient relative humidity (%)
WBACT1	Mass flow rate of main bypass stream (lb/s)
WBACT2	Mass flow rate of additional bypass stream (lb/s)
VEXITA	Calculated exit jet velocity (ft/s)



REG	DATE	TIME	WFOCR	WFOCT	ATTCA	APTCA	APSCA	WFOBA	WFOCT	LATBA	APTBA	APFBA	RTTA	AVMEX	PMS	TA	HUBN	WFOCT1	WFOCT2	VENTA	
95	18-Nov-96	14:39	1	8.35	505.1	14.38	14.38	1	0.49	510	14.38	14.38	0.99	8.848	14.38	506.6	85.981	0.49	0	38.1	
96	18-Nov-96	14:51	1.01	8.35	505.7	14.38	14.38	1.01	0.49	505.7	14.38	14.38	1	0.199	14.38	505.7	89.182	0.49	0	37.9	
97	18-Nov-96	14:57	1.01	8.35	505	14.42	14.42	1.01	0.49	505.1	14.42	14.42	1	0.304	14.38	505.2	88.883	0.49	0	37.8	
98	18-Nov-96	15:10	1.14	8.4	502	16.33	16.33	1.3	14.58	489.6	18.64	17.78	1.03	0.061	14.38	505	85.421	14.58	0	616.5	
99	18-Nov-96	15:16	1.26	0.48	496.9	17.89	17.99	1.51	18.02	490.8	21.93	20.33	1.01	0.061	14.36	505	85.733	15.31	3.72	647.4	
100	18-Nov-96	15:23	1.38	5.32	494.5	19.84	19.84	0.94	0.48	492.9	13.4	18.4	1	0.06	14.36	504.7	84.934	0.48	9.02	264.7	
101	18-Nov-96	15:43	1.17	1.21	1100.9	16.73	16.65	1.21	10.41	486.4	17.32	16.86	2.22	0.06	14.36	504.4	87.064	10.41	0	562.1	
102	18-Nov-96	16:02	1.39	1.86	1185.7	19.88	19.71	1.44	14.89	498.2	20.63	19.82	2.34	0.061	14.36	504.4	85.486	14.89	0	799.1	
103	18-Nov-96	16:12	1.54	2.12	1313.7	22	21.79	1.61	17.48	500.2	23.05	22.03	2.83	0.06	14.35	504.1	89.038	15.43	2.06	858.5	
104	18-Nov-96	16:18	1.75	2.43	1405.4	24.92	24.87	1.82	19.46	502.8	26.03	24.83	2.79	0.059	14.35	504.1	70.022	15.29	4.17	902.2	
105	18-Nov-96	16:28	1.74	2.98	1408.7	24.77	24.52	1.82	19.4	506.1	25.95	24.75	2.78	0.189	14.35	503.9	73.141	15.24	4.16	898.9	
106	18-Nov-96	16:32	1.54	2.07	1326.1	21.88	21.68	1.81	17.29	505.9	22.98	21.85	2.82	0.2	14.35	503.7	70.944	15.34	1.95	857.8	
107	18-Nov-96	16:43	1.38	1.9	1185.9	19.78	19.62	1.44	14.66	508.5	20.58	19.77	2.84	0.201	14.34	503.4	73.24	12.7	1.96	730.6	
108	18-Nov-96	16:50	1.17	1.13	1116.8	16.61	16.64	1.21	10.13	508.3	17.24	16.8	2.21	0.202	14.34	503	74.519	8.14	1.99	474.7	
109	18-Nov-96	17:00	1.17	1.09	1116.8	16.6	16.54	1.21	10.13	508.3	17.24	16.8	2.21	0.303	14.34	502.8	74.023	12.46	2.02	463.4	
110	18-Nov-96	17:09	1.39	1.9	1178.5	19.74	19.58	1.44	14.48	505.7	20.5	19.71	2.33	0.302	14.35	502.4	74.698	12.47	2.02	793.1	
111	18-Nov-96	17:11	1.39	2.04	1178.8	19.74	19.58	1.44	14.48	505.7	20.5	19.71	2.33	0.302	14.35	502.4	74.698	12.47	2.02	793.1	
112	18-Nov-96	17:15	1.54	2.18	1322.8	21.89	21.68	1.81	17.12	505.5	22.89	21.89	2.82	0.392	14.35	501.9	75.381	15.38	1.74	870.4	
113	18-Nov-96	17:20	1.74	2.42	1412.6	24.72	24.47	1.82	19.32	506.7	25.88	24.87	2.79	0.302	14.35	501.7	75.942	15.27	4.06	906.3	
114	18-Nov-96	18:51	1	0.95	508.9	14.34	14.34	1	0.49	508.9	14.34	14.34	1	0.052	14.34	506.6	68.274	0.49	0	37.8	
115	18-Nov-96	18:58	1.01	0.35	507.6	14.39	14.39	1.01	0.49	506.7	14.39	14.39	1	0.198	14.34	505.8	69.223	0.49	0	37.7	
116	18-Nov-96	19:02	1.02	0.35	506.8	14.46	14.46	1.02	0.49	506.1	14.46	14.46	1	0.301	14.34	505.2	71.006	0.49	0	37.7	
117	18-Nov-96	19:14	1.13	11.63	503.4	16.09	16.09	1.3	14.85	497.3	18.59	17.86	1.01	0.085	14.35	504	74.535	14.65	0	1005.7	
118	18-Nov-96	19:18	1.24	11.28	497	17.7	17.7	1.51	19.05	495.2	21.54	20.22	1	0.085	14.35	503.6	72.814	15.33	3.72	1007.3	
119	18-Nov-96	19:22	1.39	5.28	497.8	19.95	19.95	1.33	0.94	495.1	13.46	13.46	1.01	0.064	14.35	503.4	74.899	10.33	0	265.4	
120	18-Nov-96	19:44	1.17	1.26	1096.5	16.7	16.63	1.21	10.39	495.8	17.3	16.85	2.21	0.07	14.35	502.2	74.299	10.33	0	562.2	
121	18-Nov-96	19:55	1.39	2	1161.2	19.85	19.85	1.45	14.88	495.5	20.93	19.82	2.34	0.068	14.35	501.2	79.381	14.88	0	798.6	
122	18-Nov-96	20:07	1.54	2.18	1303	21.99	21.78	1.61	17.38	497.4	23.01	22	2.82	0.069	14.34	501.2	79.381	15.46	1.92	859	
123	18-Nov-96	20:14	1.74	2.52	1397.7	24.73	24.47	1.82	19.49	500.6	25.84	24.74	2.79	0.089	14.34	501	79.948	15.35	4.14	909.9	
124	18-Nov-96	20:22	1.79	2.47	1405	24.87	24.41	1.82	19.35	503.3	25.85	24.66	2.79	0.201	14.34	500.5	81.575	15.24	4.11	905.3	
125	18-Nov-96	20:28	1.54	2.14	1322	21.89	21.63	1.61	17.25	504.4	22.95	21.94	2.82	0.202	14.34	500.6	81.827	15.33	1.92	862.4	
126	18-Nov-96	20:42	1.39	1.95	1181.5	19.69	19.52	1.44	14.47	508	20.46	19.68	2.34	0.204	14.34	500.2	83.005	14.47	0	796.5	
127	18-Nov-96	20:52	1.17	1.16	1119.5	16.58	16.52	1.21	10.08	508	17.23	16.78	2.21	0.203	14.33	500	81.101	16.06	0	554.3	
128	18-Nov-96	20:59	1.18	1.15	1119	16.66	16.59	1.22	9.95	505.7	17.27	16.84	2.21	0.302	14.33	499.5	80.482	9.95	0	549.3	
129	18-Nov-96	21:04	1.39	1.96	1179.2	19.84	19.47	1.44	14.16	505.2	20.32	19.58	2.33	0.301	14.33	499.5	83.205	14.16	0	785.6	
130	18-Nov-96	21:10	1.53	2.1	1318.5	21.7	21.5	1.61	17.03	505.4	22.8	21.81	2.81	0.302	14.33	499.2	80.433	15.36	1.65	881.9	
131	18-Nov-96	21:18	1.74	2.43	1415.1	24.68	24.32	1.82	19.21	506.8	25.74	24.56	2.79	0.302	14.33	499	80.315	15.26	3.95	908	
132	19-Nov-96	14:16	1	0.34	511.8	14.31	14.31	1	0.48	509.3	14.31	14.31	1	0.048	14.31	504.1	55.15	0.49	0	38	
133	19-Nov-96	14:40	1.01	0.35	508	14.33	14.33	1.01	0.48	509.3	14.33	14.33	1	0.199	14.3	503.3	55.092	0.49	0	37.8	
134	19-Nov-96	14:58	1.01	0.35	506.2	14.36	14.36	1.01	0.49	506.2	14.36	14.36	1	0.301	14.3	500.5	58.468	0.49	0	37.7	
135	19-Nov-96	15:13	1.11	11.28	500.6	15.81	15.81	1.3	14.16	491.1	18.48	17.66	1.82	0.058	14.31	500.8	58.179	14.16	0	875.6	
136	19-Nov-96	15:22	1.21	11.28	493.5	17.29	17.29	1.51	19	492.3	21.67	20.91	2.36	1	0.062	14.31	500.7	57.776	15.31	3.68	1003.4
137	19-Nov-96	15:30	1.39	7.09	493.1	19.67	18.91	0.93	0.49	493.1	13.25	13.25	2.34	0.066	14.32	500.1	58.97	8.28	0	589.4	
138	19-Nov-96	16:27	1.17	1.87	1097.2	16.62	16.47	1.2	9.26	497.8	17.15	16.79	2.2	0.066	14.32	500.1	60.622	13.7	0	842.6	
139	19-Nov-96	16:37	1.39	2.81	1165.2	19.8	19.46	1.45	19.7	497.8	20.59	19.92	2.34	0.067	14.32	500.1	61.977	15.41	0.57	845.3	
140	19-Nov-96	16:49	1.54	3.07	1309.2	21.87	21.46	1.61	15.88	498.5	22.89	22.06	2.82	0.088	14.32	499.8	61.955	15.28	3.39	1004.9	
141	19-Nov-96	18:56	1.74	3.5	1394.9	24.72	24.23	1.82	18.61	501	25.93	24.93	2.78	0.088	14.32	499.8	63.861	15.25	3.41	1009.7	
142	19-Nov-96	17:11	1.74	3.51	1403	24.67	24.17	1.82	18.87	503.8	25.85	24.85	2.78	0.283	14.32	499.6	64.666	15.31	0.85	960.1	
143	19-Nov-96	17:20	1.54	3.16	1322.6	21.88	21.47	1.61	16.17	505.1	22.87	22.87	2.62	0.203	14.32	499.6	64.666	15.31	0.85	960.1	



144	18-Nov-98	17:28	1.59	2.72	1179.8	18.72	18.38	1.44	13.58	505.4	28.44	18.78	2.33	0.199	14.32	498.6	85.985	13.69	0	833.0
145	18-Nov-98	17:35	1.17	1.73	1120.7	16.81	18.49	1.2	9.19	606	17.1	16.75	2.21	0.2	14.32	498.3	85.207	9.19	0	574.1
146	18-Nov-98	17:58	1.18	1.71	1118.8	16.85	16.5	1.21	9.15	504.3	17.14	15.8	2.22	0.383	14.32	487.2	68.316	9.15	0	689.1
147	18-Nov-98	18:09	1.38	2.7	1178.3	18.62	18.28	1.44	13.35	503.2	20.3	19.87	2.34	0.303	14.32	486.7	67.848	13.35	0	821.3
148	18-Nov-98	18:21	1.54	2.94	1321.8	21.77	21.37	1.81	16.1	583.8	22.8	21.88	2.62	0.304	14.32	485.4	78.087	15.4	0.7	840.7
149	18-Nov-98	18:32	1.74	3.42	1413.2	24.88	24.17	1.83	18.85	505.8	25.82	24.83	2.6	0.304	14.32	488.3	89.916	15.23	3.43	1005.6
150	18-Nov-98	20:14	1.81	0.95	505.3	14.32	14.32	1.01	8.48	505.3	14.32	14.32	1	0.083	14.32	502.8	55.532	0.49	8	37.7







200	21-Nov-96	11:17	1	10.38	517.6	14.32	14.32	1	14.83	514.9	14.31	14.32	1.01	0.851	14.32	505.7	57.919	14.83	0	1997.5
201	21-Nov-96	11:18	1	10.39	517	14.31	14.31	1	14.84	515	14.31	14.32	1	0.05	14.32	505.4	57.216	14.84	0	1997.7
202	21-Nov-96	11:19	1	10.39	517	14.31	14.31	1	14.85	514.9	14.31	14.31	1	0.848	14.32	505.6	57.869	14.85	0	1997.8
203	21-Nov-96	11:22	1	10.4	516.3	14.31	14.31	1	14.86	514.3	14.31	14.32	1	0.851	14.31	505.4	58.894	14.86	0	1997.5
204	21-Nov-96	11:24	1	10.39	516.3	14.31	14.32	1	14.85	514.4	14.31	14.32	1	0.851	14.32	505.1	59.844	14.65	0	1996.9
205	21-Nov-96	11:26	1	10.41	515.9	14.31	14.31	1	14.87	514	14.31	14.31	1	0.851	14.31	505	59.25	14.67	0	1997.5
206	21-Nov-96	11:28	1	10.41	516	14.31	14.31	1	14.88	513.8	14.31	14.31	1	0.851	14.31	506.3	59.022	14.68	0	1997.8
207	21-Nov-96	16:34	1	0.34	522.1	14.32	14.32	1	0.46	523.7	14.32	14.32	1	0.012	14.32	512.4	46.859	0.48	0	38.7
208	21-Nov-96	16:48	1.1	0.39	505.4	15.71	15.71	1.3	14.53	493.9	18.64	17.79	1.02	0.015	14.32	507.9	50.497	14.53	0	624.3
209	21-Nov-96	17:06	1.08	0.37	502.2	15.19	15.19	1.2	11.88	486.4	17.21	16.6	1.01	0.034	14.33	504.3	55.592	11.88	0	524.1
210	21-Nov-96	17:21	1.1	0.38	502.8	15.71	15.71	1.3	14.85	499	18.64	17.79	1.01	0.044	14.33	502.4	55.43	14.85	0	831.2
211	21-Nov-96	17:40	1.19	0.42	501.3	17.07	17.07	1.52	19.94	487.5	21.71	20.42	1.03	0.05	14.33	501.6	57.481	15.35	3.69	844.2
212	21-Nov-96	17:47	1.39	7.12	486.8	19.9	18.64	0.94	0.46	484.1	13.39	13.39	1.01	0.851	14.34	501	57.566	0.46	0	345.7
213	21-Nov-96	18:18	1.17	1.84	1110.8	16.7	16.53	1.21	9.31	502.2	17.32	16.95	2.21	0.05	14.34	500.4	58.261	9.31	0	827.6
214	21-Nov-96	18:29	1.39	2.88	1176.1	19.82	19.45	1.44	13.16	502.2	20.56	18.92	2.34	0.051	14.34	500	58.773	13.16	0	827.6
215	21-Nov-96	18:48	1.54	3.13	1322.5	22.07	21.62	1.62	15.41	503.9	23.12	22.29	2.62	0.053	14.35	499	60.019	15.41	0	957.4
216	21-Nov-96	18:59	1.74	3.48	1414	24.85	24.32	1.83	17.99	504.8	26.1	25.11	2.8	0.055	14.35	498.5	60.882	15.28	2.71	1010.5
217	21-Nov-96	19:11	1.74	3.49	1413.2	24.79	24.26	1.82	17.88	505.4	25.99	25.01	2.8	0.202	14.35	498	62.18	15.24	2.52	1010.2
218	21-Nov-96	19:21	1.54	3.13	1326.8	22.02	21.56	1.61	15.37	505.7	22.98	22.17	2.62	0.204	14.35	497.4	61.634	15.37	0	959.2
219	21-Nov-96	19:29	1.39	2.88	1183.3	19.86	19.49	1.45	13.12	505.3	20.61	18.96	2.34	0.204	14.35	497.3	63.077	13.12	0	829
220	21-Nov-96	19:35	1.17	1.84	1116	18.7	16.53	1.21	8.94	506	17.23	16.88	2.21	0.204	14.35	497.2	83.68	8.94	0	572.7
221	21-Nov-96	19:45	1.17	1.79	1114.7	16.66	16.51	1.21	8.63	505.2	17.15	16.83	2.21	0.302	14.35	497.2	64.122	8.63	0	555.4
222	21-Nov-96	19:55	1.39	2.77	1183.1	19.7	19.35	1.44	12.97	504	20.49	19.85	2.35	0.302	14.35	497.3	65.252	12.97	0	815.3
223	21-Nov-96	20:09	1.54	3.06	1316.7	21.89	21.46	1.62	15.44	503.4	22.95	22.14	2.62	0.303	14.35	498.9	64.177	15.44	0	950.8
224	21-Nov-96	20:19	1.74	3.47	1408.1	24.72	24.19	1.82	17.73	504.1	25.88	24.92	2.79	0.302	14.35	498.8	63.442	15.32	2.41	1008.1
225	21-Nov-96	20:35	1.02	0.36	520.8	14.47	14.47	1.02	0.5	509	14.47	14.47	1.02	0.303	14.35	496.8	62.211	0.5	0	39.7
226	21-Nov-96	20:40	1.01	0.35	522.2	14.4	14.4	1.01	0.5	509.8	14.39	14.4	1.02	0.2	14.35	496.8	62.278	0.5	0	39.1
227	21-Nov-96	13:50	1	0.35	505.1	14.45	14.45	1	0.52	504.4	14.45	14.45	1	0.053	14.45	502.2	58.262	0.5	0.02	37.9
228	21-Nov-96	14:00	1.01	0.35	503.8	14.47	14.47	1.01	0.5	502	14.47	14.47	1	0.201	14.45	500.8	58.903	0.5	0	37.8
229	21-Nov-96	14:04	1.01	0.35	502.6	14.51	14.51	1.01	0.51	501.8	14.51	14.51	1	0.301	14.45	500.3	60.856	0.5	0.01	37.8
230	21-Nov-96	14:22	1	0.39	500.1	15.77	15.77	1.3	14.23	489	18.72	17.92	1.02	0.053	14.46	500	60.022	14.23	0	600.3
231	21-Nov-96	14:27	1.2	0.42	497.4	17.23	17.23	1.53	18	491	22.05	20.79	1.01	0.05	14.45	499.2	59.356	15.44	3.56	846.7
232	21-Nov-96	14:41	1.39	6.65	493	19.99	19.15	0.83	16.05	493.1	13.31	13.31	1	0.052	14.46	499.4	59.114	16.02	0.03	879.4
233	21-Nov-96	15:28	1.17	1.61	1105.7	16.87	16.75	1.21	9.71	500.9	17.48	17.08	2.21	0.015	14.45	499.1	58.388	9.71	0	372.6
234	21-Nov-96	15:40	1.39	2.56	1174.6	20.12	19.83	1.44	13.75	502.5	20.75	20.06	2.34	0.017	14.45	499	59.369	13.75	0	815
235	21-Nov-96	16:07	1.54	2.72	1317.9	22.22	21.68	1.61	16.23	504.8	23.23	22.34	2.61	0.015	14.46	498.6	58.038	15.39	0.84	813.7
236	21-Nov-96	16:23	1.74	3.07	1417.6	25.21	24.8	1.82	18.57	506.2	26.31	25.25	2.8	0.014	14.46	497.9	59.802	15.28	3.29	968.3
237	21-Nov-96	16:32	1.74	3.02	1408.5	25.04	24.64	1.82	18.61	506.2	26.25	25.19	2.78	0.206	14.46	497.1	61.295	15.9	3.31	980.2
238	21-Nov-96	16:35	1.54	2.73	1325.5	22.26	21.92	1.61	16.11	506.2	23.21	22.33	2.62	0.207	14.46	496.9	62.121	15.4	0.71	917.2
239	21-Nov-96	16:50	1.39	2.51	1183.8	20.08	19.6	1.44	13.7	505.1	20.77	20.07	2.34	0.207	14.47	496.4	62.354	19.7	0	812
240	21-Nov-96	17:02	1.17	1.65	1115.8	16.94	16.8	1.21	9.34	504.9	17.41	17.04	2.21	0.206	14.46	498.5	63.268	9.34	0	555.7
241	21-Nov-96	17:08	1.17	1.53	1118.6	16.85	16.74	1.21	9.41	504.4	17.45	17.07	2.21	0.301	14.46	496.2	63.241	9.41	0	555.7
242	21-Nov-96	17:13	1.39	2.44	1174.7	18.97	19.71	1.44	13.71	503.2	20.75	20.05	2.33	0.301	14.47	498.1	66.23	13.71	0	802.8
243	21-Nov-96	17:23	1.54	2.65	1317	22.05	21.73	1.61	16.19	502.7	23.15	22.27	2.62	0.301	14.47	495.7	85.319	15.46	0.74	905.7
244	21-Nov-96	17:29	1.74	3.04	1408.4	25.02	24.62	1.82	18.6	503	26.19	25.13	2.8	0.301	14.46	485.9	67.492	15.35	3.25	959
245	21-Nov-96	18:25	1	0.35	511.8	14.47	14.47	1	0.5	507.4	14.47	14.47	1.01	0.016	14.47	500.4	59.276	0.5	0	38.2
246	21-Nov-96	18:34	1.01	0.35	512.9	14.52	14.52	1.01	0.6	504.9	14.52	14.52	1.02	0.2	14.47	499.4	59.276	0.5	0	38.2
247	21-Nov-96	18:38	1.02	0.35	511.1	14.6	14.6	1.02	0.6	504.5	14.6	14.6	1.01	0.304	14.47	498	62.233	0.5	0	38.1
248	21-Nov-96	18:55	1.16	0.41	498.4	17	16.99	1.53	18.01	494.4	22.07	20.8	1.01	0.017	14.46	497.3	64.159	15.38	9.82	846.2
249	21-Nov-96	19:05	1.39	6.78	484.4	20.11	18.26	0.92	0.45	494.9	13.28	13.28	1	0.016	14.48	498.9	64.888	0.45	0	328.8



250	22-Nov-96	19:23	1.18	1.75	1095.2	17	16.95	1.21	9.74	495.8	17.56	17.16	2.21	0.017	14.47	495.7	69.628	9.74	0	520.3
251	22-Nov-96	19:34	1.39	2.65	1159.4	26.14	19.94	1.44	33.76	486.1	20.79	20.1	2.34	0.017	14.47	495.7	64.177	13.78	0	812.5
252	22-Nov-96	19:43	1.54	2.83	1300.7	22.33	21.98	1.82	38.44	498.4	23.41	22.32	2.61	0.018	14.47	495.5	64.788	15.46	0.98	814.1
253	22-Nov-96	20:10	1.74	3.16	1410.4	25.17	24.74	1.82	38.44	506.5	26.3	25.25	2.78	0.017	14.47	494.5	71.058	15.19	3.25	870.6
254	22-Nov-96	20:18	1.74	3.14	1419.9	25.18	24.73	1.82	38.44	507.4	26.31	25.27	2.8	0.2	14.47	494.3	72.55	15.19	3.25	872
255	22-Nov-96	20:25	1.54	2.72	1332	22.18	21.84	1.61	36.05	508.1	23.25	22.38	2.62	0.202	14.47	493.6	73.883	15.28	0.77	916.8
256	22-Nov-96	20:32	1.38	2.65	1188.4	20.08	19.77	1.44	33.43	508.1	20.71	20.84	2.34	0.203	14.47	493.4	73.273	13.43	0	811.2
257	22-Nov-96	20:37	1.39	2.55	1187.4	20.08	19.76	1.44	33.43	508	20.75	20.87	2.34	0.203	14.47	493.2	74.935	13.48	0	812
258	22-Nov-96	20:43	1.17	1.82	1121.2	16.88	16.76	1.21	9.36	508.7	17.47	17.09	2.21	0.203	14.46	492.6	75.302	9.36	0	567
259	22-Nov-96	20:50	1.17	1.55	1122.1	16.83	16.71	1.21	9.36	508.7	17.4	17.04	2.21	0.203	14.46	492.6	76.402	9.12	0	550.5
260	22-Nov-96	20:55	1.39	2.5	1188	19.98	19.88	1.44	33.33	508.9	20.66	20	2.34	0.301	14.46	492.6	75.4	13.33	0	801.7
261	22-Nov-96	21:01	1.54	2.7	1330.2	22.06	21.74	1.61	36.05	507.8	23.14	22.28	2.62	0.301	14.46	491.7	76.266	15.17	3.17	963.4
262	22-Nov-96	21:07	1.74	3.06	1418	24.92	24.5	1.82	38.34	507.8	26.14	25.1	2.78	0.301	14.46	491.7	76.266	15.17	3.17	963.4
263	25-Nov-96	14:06	1	0.95	512.3	14.34	14.35	1	0.5	510.2	14.34	14.35	1	0.003	14.35	506.7	75.1	8.49	0.01	38
264	25-Nov-96	15:38	1.01	0.35	506.1	14.41	14.41	1.01	0.49	504.7	14.41	14.41	1	0.202	14.35	503.8	81.581	0.49	0	37.7
265	25-Nov-96	15:43	1.02	0.35	504.9	14.48	14.48	1.02	0.49	504.4	14.48	14.48	1	0.301	14.35	503.5	83.352	0.49	0	37.7
266	25-Nov-96	15:52	1.09	10.91	500.8	16.65	15.85	1.3	14.68	493.6	18.7	17.83	1.81	0.001	14.35	503	82.89	14.86	0	976.6
267	25-Nov-96	15:59	1.16	11.1	493.2	16.93	16.93	1.51	19.01	489.5	21.71	20.4	1.01	0.001	14.35	503	82.587	15.3	3.72	992.5
268	25-Nov-96	16:03	1.39	7.45	491.6	19.98	18.88	0.9	13.47	490.3	12.86	12.86	1	0.003	14.35	502.6	82.285	13.44	0.03	827.6
269	25-Nov-96	16:17	1.17	1.9	1092.8	16.77	16.6	1.21	9.48	493.6	17.35	16.97	2.21	0.001	14.34	502.8	84.341	9.48	0	588.1
270	25-Nov-96	16:21	1.39	2.86	1154	19.98	19.61	1.44	13.64	493.1	20.7	20.02	2.34	0.002	14.34	502.5	84.886	13.64	0	828.2
271	25-Nov-96	16:31	1.54	3.55	1294.4	22.15	21.7	1.81	15.88	493.8	23.09	22.42	2.62	0.002	14.34	502.4	87.877	15.57	0.31	983.4
272	25-Nov-96	16:44	1.74	3.47	1383.1	24.88	24.45	1.82	18.24	495.3	26.08	25.08	2.78	0.001	14.33	502.3	88.301	15.29	2.95	992.4
273	25-Nov-96	16:50	1.74	3.44	1385.8	24.9	24.38	1.82	18.21	486.4	26.01	25.01	2.79	0.201	14.33	502	87.977	15.26	2.94	998.8
274	25-Nov-96	16:57	1.54	3.08	1300.8	22.05	21.62	1.61	15.81	496.8	23.03	22.18	2.62	0.202	14.33	501.7	88.929	15.37	0.44	938.8
275	25-Nov-96	17:11	1.39	2.79	1163.7	19.85	19.5	1.44	13.47	497.9	20.81	19.95	2.34	0.202	14.32	501.5	90.234	13.47	0	823.6
276	25-Nov-96	17:19	1.17	1.98	1098.7	16.7	16.54	1.21	9.39	497.6	17.33	16.85	2.21	0.202	14.32	501.3	90.144	9.39	0	592.6
277	25-Nov-96	17:28	1.17	1.74	1101.3	16.72	16.56	1.22	9.15	497.4	17.3	16.94	2.21	0.297	14.32	500.9	89.729	9.15	0	564.9
278	25-Nov-96	17:36	1.39	2.78	1163.3	19.79	19.44	1.44	13.22	496.6	20.48	19.84	2.34	0.297	14.32	500.9	89.729	9.15	0	564.9
279	25-Nov-96	17:42	1.54	3.07	1301.3	21.95	21.51	1.81	15.4	496.7	22.85	22.03	2.62	0.297	14.32	500.5	91.414	15.32	2.88	990.1
280	25-Nov-96	17:48	1.74	3.39	1389.8	24.76	24.25	1.82	18.2	497.2	25.95	24.94	2.8	0.298	14.32	500.5	91.414	15.32	2.88	990.1
281	25-Nov-96	19:14	1	0.35	508.7	14.3	14.3	1	0.49	506.6	14.3	14.3	1	0.005	14.3	508.2	78.801	0.49	0	37.8
282	25-Nov-96	19:23	1	0.35	509.5	14.32	14.32	1	0.49	505.5	14.32	14.32	1.01	0.204	14.29	506.5	79.434	0.49	0	37.9
283	25-Nov-96	19:27	1.01	0.35	508.8	14.35	14.35	1.01	0.49	505.2	14.36	14.36	1.01	0.301	14.29	505.4	83.904	0.49	0	37.8
284	25-Nov-96	19:36	1.15	12.78	496.2	16.4	16.4	1.3	14.9	491.1	18.53	17.63	1.01	0.603	14.29	504.8	84.798	14.9	0	1035.8
285	25-Nov-96	19:42	1.27	11.48	491.3	16.08	16.08	1.49	18.81	490.5	21.3	19.98	1	0.901	14.29	504	85.155	15.28	3.75	1004.9
286	25-Nov-96	19:47	1.39	9.04	491.1	19.38	18.28	0.89	15.89	485.3	12.86	12.68	1.01	0.008	14.29	503.7	85.838	15.89	0	948.9
287	25-Nov-96	20:50	1.17	1.53	1096.1	16.64	16.52	1.21	10.13	492.8	17.27	16.83	2.21	0.001	14.28	501.9	84.568	10.13	0	678.3
288	25-Nov-96	21:02	1.39	2.87	1152.3	19.89	19.56	1.44	14.21	492.1	20.59	19.85	2.34	0.003	14.28	501.5	85.007	14.21	0	832
289	25-Nov-96	21:08	1.54	3.1	1285.3	22.01	21.83	1.61	16.77	492.3	22.97	22.84	2.62	0.002	14.28	501.5	85.402	15.47	1.31	939.8
290	25-Nov-96	21:12	1.54	2.9	1291.2	22	21.83	1.61	16.76	492.6	22.97	22.84	2.62	0.003	14.28	501.6	86.001	15.45	1.31	921.5
291	25-Nov-96	21:21	1.74	3.51	1381.6	24.82	24.38	1.82	18.99	495.2	25.97	24.86	2.79	0.001	14.28	501.2	87.618	15.3	3.89	989
292	25-Nov-96	21:26	1.74	3.42	1366.3	24.82	24.38	1.82	18.97	494.4	25.97	24.86	2.79	0.001	14.28	501.2	88.572	15.27	3.89	992.2
293	25-Nov-96	21:30	1.54	2.85	1302.4	21.93	21.58	1.61	16.62	494.8	22.92	21.99	2.62	0.198	14.28	500.9	87.949	15.39	1.24	922
294	25-Nov-96	21:37	1.39	2.83	1184.6	19.78	19.47	1.43	13.89	497.5	28.44	19.72	2.34	0.198	14.28	500.6	88.153	13.89	0	826.5
295	25-Nov-96	21:46	1.17	1.55	1098.1	16.68	16.54	1.21	9.84	496.2	17.23	16.82	2.21	0.197	14.28	500.5	88.709	9.84	0	576.2
296	25-Nov-96	21:53	1.17	1.57	1101.8	16.61	16.51	1.21	8.82	496	17.23	16.82	2.21	0.3	14.28	500.3	89.367	9.82	0	576.9
297	25-Nov-96	22:01	1.39	2.55	1168.7	19.77	19.48	1.44	14	497.4	20.51	18.79	2.35	0.3	14.28	499.8	89.788	14	0	823.6
298	25-Nov-96	22:10	1.54	2.79	1299.9	21.85	21.49	1.61	16.81	496.7	22.87	21.95	2.62	0.3	14.28	499.9	89.781	15.39	1.22	915.7
299	25-Nov-96	22:14	1.74	3.11	1385.7	24.65	24.23	1.82	18.88	498.9	25.88	24.77	2.79	0.298	14.29	499.8	90.369	15.27	3.7	961.7



300	26-Nov-96	15:20	1	0.45	500.9	14.46	14.45	1	0.84	488.3	14.45	14.45	1.81	0.001	14.45	497.1	54.384	0.83	148.1
301	26-Nov-96	15:35	1.11	0.4	496.6	16.05	16.05	1.3	4.48	484.9	16.75	17.92	1.03	0.804	14.45	486.7	51.9	14.48	304.9
302	26-Nov-96	15:42	1.21	0.43	493	17.55	17.55	1.51	19	486.9	21.89	20.57	1.01	0.001	14.45	496	50.859	15.42	3.58
303	26-Nov-96	15:50	1.39	7.14	487.6	20.14	19.18	0.93	16.18	487.2	13.43	13.44	1	0.003	14.45	495.9	51.466	18.16	0.02
304	26-Nov-96	16:22	1.16	1.88	1085.3	18.85	16.69	1.21	9.66	480	17.49	17.1	2.21	0.005	14.46	495.4	50.983	9.86	0
305	26-Nov-96	16:34	1.39	2.86	1144.5	20.06	19.71	1.44	3.68	489.5	20.32	20.15	2.34	0.006	14.46	495.2	51.034	13.69	0
306	26-Nov-96	16:44	1.54	3.12	1284.5	22.32	21.81	1.81	18.07	490.4	23.33	22.48	2.62	0.004	14.46	494.8	50.063	15.8	0.48
307	26-Nov-96	17:00	1.74	3.47	1376.2	25.16	24.64	1.82	18.33	494.3	26.26	25.28	2.78	0.005	14.47	484	48.428	15.43	2.81
308	26-Nov-96	18:19	1	8.05	494	14.5	14.5	1	19.88	493.5	14.5	14.51	1	0.198	14.48	484	44.903	13.88	0
309	26-Nov-96	18:45	1.17	1.83	1086.6	16.94	16.76	1.21	8.47	491	17.51	17.13	2.21	0.199	14.48	491.7	46.167	13.49	8
310	26-Nov-96	18:53	1.39	2.86	1145.8	20.09	19.74	1.44	13.48	489.5	26.77	20.12	2.34	0.197	14.48	491.4	46.569	15.65	0.27
311	26-Nov-96	19:00	1.54	3.07	1263	22.2	21.78	1.61	15.92	488.7	25.33	25.33	2.78	0.199	14.49	491.9	47.922	15.59	2.84
312	26-Nov-96	19:08	1.74	3.48	1384.4	25.19	24.68	1.82	18.48	488.3	26.14	25.16	2.79	0.3	14.48	491.3	49.122	15.52	2.76
313	26-Nov-96	19:12	1.74	3.63	1371.5	25.08	24.55	1.82	18.28	491.2	23.19	22.37	2.62	0.381	14.49	491.4	49.5	15.58	0.17
314	26-Nov-96	19:19	1.55	3.07	1289.8	22.24	21.82	1.61	15.75	493	20.67	20.03	2.34	0.302	14.49	491.2	50.609	19.31	0
315	26-Nov-96	19:28	1.39	2.86	1167.6	19.94	19.6	1.44	13.31	494.9	17.51	17.14	2.22	0.303	14.49	491.3	48.438	9.4	0
316	26-Nov-96	19:43	1.17	1.7	1099.4	16.9	16.75	1.22	9.4	495.7	14.55	14.55	1.13	0.303	14.49	491.3	48.878	0.53	0
317	26-Nov-96	19:49	1.01	0.36	588.5	14.55	14.56	1.01	0.53	518.9	14.55	17.19	2.21	0.003	14.5	498.1	45.809	9.51	0
318	26-Nov-96	20:53	1.17	1.88	1091.7	16.91	16.74	1.21	9.51	493.3	17.57	17.19	2.21	0.003	14.5	498.1	45.809	9.51	0
319	26-Nov-96	21:03	1.39	3.02	1147.3	20.2	19.81	1.44	13.38	491.3	20.89	20.25	2.34	0.002	14.5	495.2	46.797	13.98	0
320	26-Nov-96	21:08	1.54	3.18	1265.4	22.28	21.83	1.61	15.88	490	23.42	22.59	2.62	0.005	14.5	494.8	47.819	15.85	0.23
321	26-Nov-96	21:15	1.74	3.6	1364.5	25.18	24.63	1.82	18.34	489.3	26.44	25.46	2.78	0.003	14.5	494.7	50.759	15.54	2.8
322	26-Nov-96	21:23	1.73	3.4	1366.7	25.09	24.53	1.82	18.1	493.6	26.26	25.29	2.78	0.206	14.5	493.6	51.688	15.49	2.61
323	26-Nov-96	21:32	1.54	3.13	1293.8	22.22	21.78	1.61	15.59	481.5	23.35	22.53	2.62	0.215	14.51	492.4	53.982	15.59	0
324	26-Nov-96	21:49	1.39	2.93	1161.3	20.09	19.7	1.44	13.11	496.8	20.77	20.14	2.34	0.206	14.51	491.8	53.468	13.11	0
325	26-Nov-96	22:01	1.17	1.83	1099.2	16.88	16.71	1.21	8.75	499.1	17.46	17.1	2.2	0.204	14.51	491.4	53.441	4.86	3.89
326	26-Nov-96	22:09	1.17	1.83	1099.8	16.82	16.75	1.21	8.56	496.7	17.42	17.08	2.21	0.301	14.51	491.3	55.35	4.85	3.7
327	26-Nov-96	22:16	1.38	2.81	1161.6	19.95	19.6	1.44	13.17	495.5	20.78	20.14	2.34	0.301	14.51	491.2	55.206	13.17	0
328	26-Nov-96	22:23	1.54	3.14	1299.3	22.2	21.75	1.61	15.59	495.5	23.24	22.44	2.62	0.301	14.51	491.4	53.4	15.59	0
329	26-Nov-96	22:32	1.74	3.62	1364	25.15	24.59	1.82	17.84	485.7	26.22	25.27	2.79	0.301	14.51	491.3	52.819	15.46	2.38
330	26-Nov-96	22:32	1.74	3.75	1384.1	25.15	24.59	1.82	17.84	485.7	26.22	25.27	2.79	0.3	14.51	491.3	52.856	15.46	2.38
331	2-Dec-96	15:56	1	0.35	501	14.32	14.32	1	0.5	502.4	14.32	14.32	1	0.001	14.32	502.7	59.246	0.49	0.01
332	2-Dec-96	16:05	1	0.35	501.4	14.35	14.35	1	0.5	501.1	14.35	14.35	1	0.199	14.32	502.2	61.398	0.49	0
333	2-Dec-96	16:10	1.01	0.35	501	14.38	14.38	1.01	0.49	501.1	14.38	14.38	1	0.3	14.32	501.8	60.807	14.32	0
334	2-Dec-96	16:25	1.1	0.39	498.5	15.81	15.81	1.3	14.32	487.9	18.58	17.77	1.02	0.002	14.33	501.8	60.807	14.32	0
335	2-Dec-96	16:29	1.21	0.44	497.3	17.39	17.39	1.53	18.04	488.7	21.88	20.61	1.02	0.002	14.33	501.5	61.194	15.4	3.63
336	2-Dec-96	16:40	1.39	7.03	490	19.93	19	0.92	0.49	490.5	13.24	13.25	1	0.002	14.33	501.1	60.719	0.48	0.03
337	2-Dec-96	17:26	1.17	1.76	1093.9	16.8	16.84	1.21	9.51	494.1	17.35	16.87	2.21	0.003	14.34	499.9	62.752	9.51	0
338	2-Dec-96	17:40	1.39	2.66	1180.9	19.92	19.6	1.44	13.67	495.8	20.69	20	2.34	0.002	14.34	499.8	66.025	13.67	0
339	2-Dec-96	17:50	1.54	2.89	1303.1	22.1	21.71	1.61	16.05	497.7	23.15	22.29	2.62	0.003	14.34	499.4	66.488	15.52	0.53
340	2-Dec-96	17:58	1.74	3.24	1394.4	24.86	24.5	1.82	18.36	500.1	26.15	25.13	2.79	0.003	14.34	499.3	67.583	15.31	3.08
341	2-Dec-96	18:01	1.74	3.32	1398.2	25	24.54	1.82	18.33	501	26.16	25.14	2.79	0.002	14.34	499.2	69.522	15.35	2.98
342	2-Dec-96	18:09	1.74	3.23	1404.7	24.93	24.48	1.82	18.22	503.4	26.08	25.06	2.79	0.199	14.34	498.3	71.365	15.25	2.87
343	2-Dec-96	18:18	1.55	2.9	1324.5	22.19	21.74	1.81	15.79	504.8	23.88	22.23	2.62	0.201	14.34	498.7	73.349	15.41	0.31
344	2-Dec-96	18:32	1.39	2.67	1182.6	19.96	19.63	1.44	13.33	505.5	23.82	18.95	2.34	0.201	14.34	498.4	75.951	13.33	0
345	2-Dec-96	18:43	1.17	1.84	1121.8	16.75	16.81	1.21	9.45	505.7	17.36	17	2.22	0.2	14.34	497.6	71.967	9.45	0
346	2-Dec-96	18:52	1.16	1.9	1118.7	16.75	16.81	1.22	9.21	505.2	17.33	18.96	2.22	0.3	14.34	497.7	72.773	8.21	0
347	2-Dec-96	18:58	1.38	2.56	1182.8	19.82	19.52	1.45	13.4	504.3	20.62	18.95	2.35	0.3	14.35	498.6	72.326	13.4	0
348	2-Dec-96	19:08	1.54	2.82	1324.7	21.86	21.58	1.82	15.74	504.5	23.03	22.18	2.63	0.299	14.34	495.8	73.283	15.42	0.32
349	2-Dec-96	19:16	1.74	3.19	1407.1	24.79	24.33	1.82	18.15	505.3	25.98	24.97	2.78	0.3	14.34	495.4	75.351	15.28	2.87



350	2-Dec-96	28:19	1	0.35	514.6	14.35	14.35	14.35	1	0.49	508.9	14.35	14.35	1.01	0.005	14.35	499.9	68.802	0.49	0	38.3
351	2-Dec-96	20:27	1.01	0.35	513.3	14.41	14.41	14.41	1.01	0.49	505.8	14.41	14.41	1.01	0.263	14.35	499.1	74.557	0.49	0	38.3
352	2-Dec-96	20:33	1.02	0.35	509.8	14.48	14.48	14.48	1.02	0.5	504.5	14.48	14.48	1.01	0.3	14.35	497.7	80.598	0.5	0	38.4
353	2-Dec-96	20:46	1.09	0.38	504.1	15.87	15.87	15.87	1.3	14.47	487.9	18.86	17.83	1.01	0.003	14.35	496.6	78.219	14.47	0	522.6
354	2-Dec-96	20:51	1.19	0.42	501.2	17.06	17.06	17.06	1.52	19.04	495.1	21.85	20.58	1.01	0.003	14.35	496.5	78.902	15.48	9.56	657.1
355	2-Dec-96	21:01	1.39	0.75	494.4	19.96	19.02	19.02	0.92	0.45	494.6	13.27	13.27	1.01	0.004	14.35	496.5	75.426	0.45	0	340.9
356	2-Dec-96	21:22	1.17	1.08	1094.6	16.77	16.61	16.61	1.21	8.48	496	17.38	17	2.21	0.003	14.35	496.3	70.032	8.48	0	678.7
357	2-Dec-96	21:35	1.39	2.78	1161.1	19.96	19.62	19.62	1.44	13.45	495.9	20.7	20.03	2.34	0.004	14.35	498.3	74.331	13.45	0	819.4
358	2-Dec-96	21:47	1.54	3.17	1307.5	22.14	21.73	21.73	1.62	15.77	498.6	23.19	22.35	2.62	0.003	14.35	495.5	78.265	15.5	0.27	954.8
359	2-Dec-96	21:58	1.74	3.78	1402.6	25.01	24.5	24.5	1.82	18.11	501.7	26.17	25.17	2.9	0.003	14.35	495.3	79.853	15.33	2.78	1035.1
360	2-Dec-96	22:03	1.74	3.78	1406.2	24.93	24.42	24.42	1.82	17.96	503.7	26.04	25.06	2.79	0.2	14.35	495.3	79.823	15.27	2.68	1036
361	2-Dec-96	22:12	1.54	3.29	1326.7	22.98	21.65	21.65	1.61	15.4	505.5	23.05	22.23	2.62	0.2	14.35	495.1	81.641	15.4	0	974.7
362	2-Dec-96	22:23	1.39	2.77	1187	19.93	19.58	19.58	1.44	13.15	506.5	20.63	19.98	2.34	0.2	14.35	495	81.209	13.15	0	824.8
363	2-Dec-96	22:37	1.17	1.89	1119.3	16.73	16.6	16.6	1.21	9.37	506.4	17.39	17.01	2.2	0.2	14.35	494.8	81.517	9.37	0	574.4
364	2-Dec-96	22:48	1.17	1.71	1117.6	16.73	16.59	16.59	1.22	8.26	505.9	17.42	17.05	2.21	0.301	14.35	494.3	82.603	9.26	0	571.5
365	2-Dec-96	22:55	1.55	3.12	1325.9	22.08	21.66	21.66	1.61	15.4	505.5	22.99	22.18	2.62	0.3	14.34	493.8	83.669	12.97	0	912.4
366	2-Dec-96	22:56	1.75	3.36	1409.4	24.89	24.39	24.39	1.82	17.98	505.8	26.01	25.03	2.79	0.3	14.34	493.7	82.231	15.4	0	958.6
367	2-Dec-96	13:58	1	0.34	513.6	14.27	14.27	14.27	1	0.49	515.6	14.27	14.27	1	0.004	14.27	510.9	62.748	0.49	0	38.2
368	2-Dec-96	14:10	1.07	0.36	506.4	15.29	15.29	15.29	1.3	13.66	493.1	18.59	17.78	1.03	0.004	14.27	509.2	62.943	13.66	0	590.4
369	2-Dec-96	14:14	1.18	0.43	502	16.82	16.82	16.82	1.58	19.05	491.4	22.49	21.24	1.02	0.004	14.27	508.5	64.18	15.33	3.72	951.1
370	2-Dec-96	14:19	1.39	0.747	493.9	18.84	18.8	18.8	0.91	0.47	492.9	12.88	12.98	1	0.004	14.27	508.1	82.804	0.45	0.03	380.2
371	2-Dec-96	14:30	1	0.35	492.9	14.3	14.3	14.3	1	0.5	498.1	14.3	14.3	0.99	0.2	14.27	506.7	85.375	0.5	0	37.6
372	2-Dec-96	14:36	1.01	0.35	495.7	14.33	14.33	14.33	1.01	0.48	501.9	14.33	14.33	0.99	0.3	14.27	505.3	87.952	0.48	0	37.8
373	2-Dec-96	15:25	1.17	1.86	1101.6	16.87	16.52	16.52	1.22	9.12	499.2	17.34	16.98	2.21	0.3	14.28	502.2	73.225	9.12	0	576.4
374	2-Dec-96	15:27	1.17	1.95	1101.9	16.58	16.42	16.42	1.21	8.8	499.5	17.11	16.79	2.21	0.3	14.28	502.2	73.329	8.6	0	585.6
375	2-Dec-96	15:27	1.17	1.87	1101.8	16.58	16.42	16.42	1.21	8.67	499.5	17.12	16.8	2.21	0.3	14.28	502.1	79.859	8.7	0	590.8
376	2-Dec-96	15:28	1.18	1.78	1102.5	16.7	16.54	16.54	1.22	9.15	499.2	17.38	17.02	2.21	0.3	14.28	502.1	73.549	9.15	0	570.1
377	2-Dec-96	15:44	1.4	2.88	1171.1	19.81	19.44	19.44	1.44	12.81	500.3	20.48	19.87	2.34	0.3	14.28	501.8	74.613	12.81	0	814.9
378	2-Dec-96	16:03	1.55	3.11	1323.8	21.94	21.49	21.49	1.61	15.15	503.5	22.89	22.11	2.63	0.3	14.28	501.6	76.223	15.15	0	950.7
379	2-Dec-96	16:10	1.74	3.52	1408	24.74	24.2	24.2	1.82	17.51	504.7	25.86	24.91	2.79	0.3	14.29	501.5	78.321	15.32	2.19	1016.7
380	2-Dec-96	16:17	1.74	3.51	1411	24.81	24.27	24.27	1.82	17.6	506.2	25.98	25.02	2.79	0.202	14.29	501.4	78.254	15.22	2.37	1015.7
381	2-Dec-96	16:21	1.54	3.08	1328.3	21.96	21.52	21.52	1.82	15.32	507.1	23.03	22.22	2.62	0.203	14.29	501.3	75.993	15.32	0	958.4
382	2-Dec-96	16:37	1.39	2.89	1188.9	19.86	19.49	19.49	1.44	12.9	508.1	20.59	19.96	2.94	0.2	14.29	501.2	80.992	12.9	0	830.9
383	2-Dec-96	16:46	1.17	1.88	1125.6	16.72	16.56	16.56	1.22	9.13	507.9	17.38	17.02	2.22	0.2	14.3	501.1	81.448	9.13	0	597.4
384	2-Dec-96	16:58	1.17	2.03	1119.8	16.71	16.53	16.53	1.21	9.1	507.2	17.33	16.98	2.21	0.003	14.3	501.3	80.461	9.1	0	605.2
385	2-Dec-96	17:05	1.39	2.87	1185.5	19.88	19.5	19.5	1.44	13.05	508.4	20.66	20.02	2.34	0.003	14.3	501.3	81.807	13.05	0	831.9
386	2-Dec-96	17:18	1.54	3.14	1328.9	22.01	21.56	21.56	1.61	15.21	507.1	22.98	22.18	2.62	0.002	14.3	501.1	83.09	15.21	0	980.2
387	2-Dec-96	17:23	1.74	3.52	1417.7	24.88	24.33	24.33	1.82	17.58	508.5	26.04	25.08	2.79	0.003	14.3	501.1	82.959	15.11	2.48	1016.8
388	2-Dec-96	18:31	1	0.34	527	14.31	14.31	14.31	1	0.49	517.4	14.3	14.31	1.02	0.003	14.31	507.1	71.961	0.49	0	38.7
389	2-Dec-96	18:45	1.01	0.35	522.4	14.36	14.37	14.37	1.01	0.49	512	14.38	14.37	1.02	0.203	14.31	505.4	80.247	0.49	0	38.6
390	2-Dec-96	18:54	1.01	0.35	518.8	14.43	14.44	14.44	1.02	0.49	510.3	14.43	14.44	1.01	0.299	14.31	503.9	79.71	0.49	0	38.5
391	2-Dec-96	19:07	1.06	0.36	506.5	15.1	15.1	15.1	1.3	13.9	499.2	18.61	17.83	1.01	0.004	14.31	502.6	80.598	13.9	0	804.3
392	2-Dec-96	19:12	1.14	0.42	504	16.92	16.32	16.32	1.56	19.02	498.2	22.31	21.08	1.02	0.004	14.32	502.3	80.791	15.42	3.6	957.9
393	2-Dec-96	19:24	1.39	0.738	485.3	19.91	18.87	18.87	0.91	0.45	485.8	19.02	13.03	1	0.003	14.32	501.6	77.66	0.45	0	358.3
394	2-Dec-96	19:39	1.17	1.98	1102.7	16.77	16.58	16.58	1.22	9.22	497	17.41	17.05	2.22	0.003	14.32	508.7	78.318	9.22	0	586.7
395	2-Dec-96	19:47	1.39	3.05	1162.8	19.98	19.58	19.58	1.45	13.15	495.6	20.74	20.11	2.35	0.002	14.32	500.5	79.516	13.15	0	833.9
396	2-Dec-96	20:03	1.54	3.26	1303.7	22.09	21.61	21.61	1.61	15.49	490.9	25.12	22.39	2.62	0.001	14.32	500.1	81.16	15.49	0	960.6
397	2-Dec-96	20:21	1.76	3.7	1400.1	25	24.42	24.42	1.81	17.38	501.7	25.99	25.07	2.79	0.002	14.33	499.8	79.14	15.3	2.09	1026.5



400	3-Dec-96	20:32	1.74	3.78	1405.8	24.89	24.32	1.82	17.43	503.9	25.99	25.06	2.78	0.2	14.33	499.9	82.738	15.26	2.15	1086.8
401	3-Dec-96	20:48	1.54	3.27	1319.6	22.01	21.55	1.82	15.39	584	23.16	22.36	2.62	0.2	14.33	498.9	82.152	15.39	0	970.8
402	3-Dec-96	21:02	1.4	3.05	1180.3	19.94	19.54	1.44	12.73	504	20.57	19.96	2.34	0.2	14.33	498.5	84.447	12.79	0	892
403	3-Dec-96	21:14	1.17	2.11	1118.9	16.78	16.91	1.21	8.89	603.5	17.34	17	2.22	0.2	14.33	498.5	83.574	8.88	0	584.6
404	3-Dec-96	21:34	1.18	1.9	1111.5	16.75	16.57	1.21	8.82	502.2	17.27	16.95	2.21	0.3	14.33	497.9	86.734	8.62	0	582.7
405	3-Dec-96	21:43	1.39	2.9	1172.8	19.84	19.46	1.44	12.77	500.8	20.67	19.97	2.34	0.3	14.33	497.8	86.727	12.77	0	815.1
406	3-Dec-96	21:57	1.54	3.32	1313.3	21.96	21.5	1.82	15.2	580.5	23.01	22.34	2.82	0.299	14.34	497.4	87.566	15.2	0	883.9
407	3-Dec-96	22:09	1.74	3.62	1399.2	24.78	24.22	1.82	17.43	581.8	25.92	25	2.79	0.299	14.34	497.4	87.334	15.34	2.08	1019.4
408	4-Dec-96	14:04	1	0.35	506.5	14.47	14.48	1	0.49	504.7	14.47	14.48	1	0.804	14.48	502.1	87.354	0.49	0	37.7
409	4-Dec-96	14:06	1	0.35	506.3	14.47	14.48	1	0.49	504.7	14.47	14.48	1	0.804	14.48	502.1	87.481	0.49	0	37.8
410	4-Dec-96	14:21	1	0.35	504.3	14.5	14.5	1	0.5	502	14.5	14.5	1	0.199	14.47	501.3	71.083	0.5	0	37.6
411	4-Dec-96	14:33	1.01	0.35	503	14.54	14.54	1.01	0.5	502.8	14.54	14.54	1	0.3	14.47	500.2	74.281	0.5	0	37.7
412	4-Dec-96	15:05	1.11	0.42	499.5	18.1	16.1	1.3	14.62	489.3	18.81	17.98	1.02	0.003	14.48	500	89.722	14.6	0.03	614
413	4-Dec-96	15:09	1.22	0.47	494.3	17.81	17.81	1.31	18	489	21.82	20.57	1.01	0.003	14.48	499.8	88.311	15.44	3.56	845.1
414	4-Dec-96	15:20	1.4	0.73	491.2	20.21	18.1	0.9	0.45	490.9	13.09	13.11	1	0.002	14.48	499.7	88.634	0.45	0	964.5
415	4-Dec-96	16:03	1.18	1.75	1166.2	16.97	16.72	1.21	9.61	499.7	17.45	17.07	2.21	0.002	14.48	499	70.512	9.57	0.04	578.1
416	4-Dec-96	16:22	1.39	2.78	1177	20.14	19.8	1.44	13.75	504.7	20.84	20.16	2.33	0.003	14.48	498.9	71.853	13.69	0.06	839.4
417	4-Dec-96	16:35	1.54	2.88	1329.5	22.31	21.91	1.61	16.11	507.8	23.39	22.45	2.82	0.002	14.49	498.9	72.816	15.35	0.75	940.5
418	4-Dec-96	16:50	1.75	3.39	1426.7	25.39	24.85	1.82	18.31	511.1	26.36	25.34	2.79	0.002	14.49	496.7	75.338	15.22	3.08	1002.6
419	4-Dec-96	16:57	1.74	3.38	1426.4	25.2	24.71	1.82	18.2	511.5	26.24	25.21	2.79	0.203	14.49	498.4	74.949	15.13	3.07	998.4
420	4-Dec-96	17:08	1.55	2.98	1340.3	22.33	21.93	1.82	18.86	511.2	23.36	22.48	2.82	0.203	14.49	498.1	75.955	15.28	0.77	842.7
421	4-Dec-96	17:18	1.39	2.72	1198.6	20.12	19.79	1.44	13.59	510.6	20.83	20.15	2.34	0.203	14.49	497.3	76.313	13.53	0.06	832.4
422	4-Dec-96	17:23	1.54	2.95	1336.5	22.25	21.85	1.61	15.98	510.6	23.26	22.4	2.62	0.204	14.49	497.1	75.998	15.33	0.64	941.9
423	4-Dec-96	17:29	1.18	1.75	1129.4	16.98	16.82	1.21	9.64	510.2	17.56	17.17	2.21	0.203	14.49	496.7	75.072	9.51	0.04	588.6
424	4-Dec-96	17:45	1.18	1.71	1124.3	16.92	16.78	1.21	9.31	508.5	17.47	17.1	2.21	0.3	14.48	496.4	79.194	9.27	0.03	571.8
425	4-Dec-96	17:52	1.39	2.69	1191.1	20.06	19.73	1.44	13.51	507.9	20.78	20.11	2.36	0.301	14.48	496.1	79.839	13.47	0.03	824
426	4-Dec-96	17:57	1.54	2.95	1332.3	22.21	21.81	1.61	15.92	507.7	23.2	22.34	2.82	0.301	14.49	498.1	79.831	15.39	0.54	838.1
427	4-Dec-96	18:00	1.55	3.03	1334.3	22.28	21.88	1.62	18.03	507.7	23.3	22.43	2.83	0.301	14.49	496	79.995	15.39	0.69	945.8
428	4-Dec-96	18:05	1.74	3.05	1419	25.12	24.83	1.82	18.34	508	26.24	25.21	2.79	0.301	14.49	496.1	80.774	15.28	3.08	1023.3
429	4-Dec-96	18:26	1	0.35	505.8	14.49	14.49	1	0.51	507.2	14.48	14.48	1	0.003	14.49	504.3	60.342	0.5	0.01	37.8
430	4-Dec-96	18:35	1	0.35	504.6	14.51	14.51	1	0.51	504.7	14.51	14.51	1	0.2	14.49	502	71.406	0.49	0.01	37.7
431	4-Dec-96	19:51	1.01	0.35	503.8	14.54	14.55	1.01	0.5	504.3	14.55	14.55	1	0.299	14.48	497.8	80.821	0.5	0	37.8
432	4-Dec-96	20:10	1.74	3.42	1394.7	25.05	24.55	1.82	18.31	498.9	26.26	25.27	2.8	0.3	14.48	496	81.188	15.41	2.9	989.7
433	4-Dec-96	20:16	1.54	3.02	1304.8	22.17	21.75	1.61	15.95	496.9	23.2	22.38	2.83	0.3	14.48	495.8	81.775	15.55	0.3	933.9
434	4-Dec-96	20:25	1.39	2.73	1164	19.89	19.66	1.44	13.51	496.9	23.2	22.38	2.83	0.3	14.48	495.5	81.006	13.48	0.06	810.4
435	4-Dec-96	20:34	1.18	1.74	1109.6	16.92	16.77	1.22	9.33	488.3	17.49	17.12	2.22	0.3	14.48	495.2	82.256	9.29	0.04	564.2
436	4-Dec-96	20:50	1.17	1.72	1102.3	16.87	16.73	1.22	9.33	488.3	17.49	17.12	2.22	0.3	14.48	495.1	82.057	9.52	0.04	572.4
437	4-Dec-96	20:57	1.39	2.78	1173.9	20.05	19.7	1.44	13.46	499.5	17.51	17.13	2.21	0.2	14.48	495.1	82.057	9.52	0.04	572.4
438	4-Dec-96	21:02	1.54	3.03	1312.4	22.27	21.85	1.82	15.98	501.5	23.37	22.52	2.82	0.189	14.48	495.4	88.892	15.48	0.54	938
439	4-Dec-96	21:07	1.74	3.4	1403	25.1	24.8	1.82	18.29	502.6	26.33	25.93	2.79	0.2	14.48	495.2	80.685	15.34	2.95	982.4
440	4-Dec-96	21:14	1.74	3.43	1400.7	25.19	24.69	1.82	18.3	503.7	26.4	25.99	2.78	0.003	14.48	495.2	80.95	15.39	2.91	987.5
441	4-Dec-96	21:18	1.54	3.04	1320.8	22.31	21.89	1.62	15.98	504.3	23.39	22.54	2.82	0.003	14.48	495.1	81.597	16.45	0.51	943.8
442	4-Dec-96	21:26	1.39	2.77	1179.9	20.86	19.72	1.44	13.53	504.9	20.85	20.18	2.34	0.003	14.48	495.1	79.932	13.48	0.07	826
443	4-Dec-96	21:34	1.17	1.81	1114.2	16.91	16.78	1.22	9.77	504.5	17.61	17.21	2.21	0.003	14.47	495.4	78.867	9.79	0.04	594.1
444	5-Dec-96	13:49	1	11.3	513.7	14.24	14.24	1	15.98	510.1	14.24	14.24	1.81	0.002	14.24	502.5	55.399	15.98	8.01	1057.9
445	5-Dec-96	14:02	1.01	11.28	509.8	14.27	14.27	1.01	15.97	505.5	14.27	14.27	1.01	0.2	14.23	501.8	56.002	15.96	8.02	1058.3
446	5-Dec-96	14:10	1.01	11.33	507	14.31	14.31	1.01	16.02	504.9	14.31	14.31	1	0.299	14.23	500.7	58.598	16.01	0.01	1058.6
447	5-Dec-96	14:36	1.39	2.49	1162.4	19.65	19.38	1.44	13.55	499.3	20.32	19.66	2.33	0.3	14.21	499	60.41	13.49	0.08	798.2
448	5-Dec-96	14:41	1.55	2.98	1295.3	21.82	21.49	1.81	18.07	493.7	22.78	21.82	2.62	0.3	14.21	499	60.091	95.63	0.44	946.6
449	5-Dec-96	14:51	1.74	3.03	1379	24.57	24.17	1.82	18.59	494.5	25.72	24.68	2.79	0.3	14.2	498.7	61.333	15.44	3.15	959.6



450	5-Dec-86	16:03	1.74	3.06	1363.5	24.89	24.28	1.82	16.51	498.8	25.77	24.74	2.78	0.2	14.2	498.8	56.938	15.37	3.15	1988.5
451	5-Dec-86	15:13	1.54	2.7	1313.2	21.84	21.5	1.81	16.04	501.5	22.81	21.95	2.92	0.2	14.2	498.8	59.227	15.43	3.61	1921.4
452	5-Dec-86	15:18	1.54	2.7	1313	21.84	21.5	1.81	16.04	502	22.82	21.96	2.92	0.2	14.2	498.8	59.688	15.43	3.61	1922
453	5-Dec-86	15:24	1.39	2.48	1178.4	19.72	19.44	1.44	13.56	503	20.39	19.71	2.34	0.2	14.19	498.8	59.393	15.52	3.04	1815.1
454	5-Dec-86	15:37	1.74	3.53	1409.1	24.71	24.3	1.82	18.5	503.8	25.88	24.81	2.6	0.005	14.19	498.8	58.888	15.29	3.21	1872.8
455	5-Dec-86	15:42	1.54	2.7	1322.4	21.8	21.85	1.61	16.12	504.1	22.91	22.03	2.82	0.005	14.19	498.1	58.153	15.36	0.78	1924.2
456	5-Dec-86	15:53	1.39	2.49	1178.5	19.75	19.47	1.44	13.75	503.8	20.48	19.78	2.34	0.005	14.16	499.3	58.582	13.09	0.05	1922.2
457	5-Dec-86	16:49	1	1.34	521.2	14.19	14.19	1	10.51	511.9	14.19	14.18	1.02	0.006	14.19	503.8	44.882	0.48	0.82	38.5
458	5-Dec-86	16:55	1.01	0.34	521.9	14.23	14.23	1.01	0.5	510.2	14.23	14.23	1.02	0.281	14.19	503.4	50.615	0.49	0.02	38.5
459	5-Dec-86	17:01	1.01	0.34	518.8	14.27	14.27	1.01	0.5	509.7	14.27	14.27	1.02	0.3	14.19	502.2	54.284	0.49	0.02	38.4
460	5-Dec-86	17:34	1.39	2.71	1165.5	18.57	18.24	1.44	15.21	497.7	20.34	19.7	2.35	0.001	14.17	499.6	63.48	13.15	0.06	1815.1
461	5-Dec-86	17:38	1.54	2.97	1303.5	21.86	21.27	1.61	16.59	498.2	22.73	21.92	2.82	0.3	14.17	498.3	65.845	15.56	0.04	1948.3
462	5-Dec-86	17:47	1.74	3.36	1393.9	24.49	24	1.82	17.88	498.9	25.68	24.71	2.79	0.3	14.16	499.1	65.891	15.41	2.48	1902.4
463	5-Dec-86	18:00	1.74	3.38	1405.1	24.61	24.1	1.82	17.99	503.7	25.78	24.8	2.79	0.2	14.16	499.2	65.284	15.32	2.57	1903.1
464	5-Dec-86	18:10	1.54	3.04	1328	21.82	21.39	1.61	15.47	505.2	22.76	21.85	2.82	0.2	14.17	499.3	65.857	15.4	0.06	1961
465	5-Dec-86	18:19	1.39	2.75	1177.4	19.53	19.28	1.44	15.21	504.9	20.38	19.73	2.39	0.2	14.16	499.2	67.88	13.15	0.06	1827.5
466	5-Dec-86	18:35	1.74	3.4	1413.3	24.88	24.17	1.82	17.88	505.9	25.84	24.86	2.78	0.002	14.16	498.3	72.547	15.31	2.58	1014.8
467	5-Dec-86	18:47	1.54	3.22	1328.8	21.81	21.39	1.61	15.48	505.8	22.76	21.95	2.78	0.003	14.16	498.4	73.559	15.42	0.07	1902.2
468	5-Dec-86	18:55	1.39	2.77	1185.5	18.69	18.34	1.44	15.28	505.5	20.44	19.78	2.35	0.003	14.16	499.4	74.125	13.22	0.06	1948.8
469	5-Dec-86	20:42	1.39	2.88	1165.8	18.66	18.29	1.44	13.08	498.6	20.44	19.81	2.34	0.004	14.16	504.1	78.802	13.04	0.04	1827.2
470	5-Dec-86	20:50	1.54	3.14	1303.9	21.85	21.38	1.82	16.43	497	22.87	22.07	2.82	0.004	14.16	502.2	80.832	15.4	0.03	1958.3
471	5-Dec-86	21:01	1.74	3.88	1360.8	24.68	24.13	1.82	17.65	497.4	25.82	24.88	2.8	0.005	14.16	501.4	82.163	15.36	2.28	1023.8
472	5-Dec-86	21:13	1.74	3.55	1394.8	24.59	24.04	1.82	17.5	499.7	25.71	24.77	2.79	0.2	14.15	499.8	84.018	15.45	2.05	1822.5
473	5-Dec-86	21:31	1.55	3.18	1315.2	21.82	21.86	1.61	15.15	502.4	22.74	21.96	2.82	0.2	14.15	498.3	86.485	15.11	0.04	1958.8
474	5-Dec-86	21:41	1.4	2.91	1177.1	19.71	19.33	1.44	12.83	502.5	20.37	19.75	2.34	0.2	14.15	497.8	87.333	12.82	0.01	1828.8
475	5-Dec-86	21:49	1.39	2.85	1182.2	19.59	19.22	1.44	12.58	502.8	20.23	19.83	2.35	0.3	14.15	497.1	89.858	12.58	0	1817.4
476	5-Dec-86	21:59	1.54	3.07	1323.8	21.86	21.23	1.82	15.17	504.4	22.73	21.95	2.82	0.3	14.15	495.7	90.223	15.13	0.04	1954.8
477	5-Dec-86	22:09	1.74	3.51	1415.5	24.49	23.95	1.82	17.3	508.4	25.91	24.88	2.8	0.3	14.15	498.8	99.497	15.36	1.92	1929



## Acoustic Data

[Compiled according to the listing of nozzles and mixers in Table 3.1; e.g., first is for 100%L, CONF at condition A, B, ..., L (ref. Table 3.2), second is for 100%L, 12CL at condition A, B, ..., L etc.]



## **100%L, CONF**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L



71570



194

Data ambient 14.70 posia  
Data ambient 537.0 A  
Data ambient 70.00%  
Data scale 1

Distance	1831.18	1772.05	1655.07	1598.27	1552.81	1523.14	1505.73	1506.73	1523.14	1552.81	1598.27	1655.07	1732.05	1831.18	1958.11	2121.32	2333.58	2615.17	3000	3549.3	4365.71	5795.55
distance [m]	55	0	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155
angle [°]	55	0	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155
frequency	55	0	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.85	48.03	47.18	46.22	45.19	44.12	43.04	41.96	40.88	39.80	38.72	37.64	36.56	35.48	34.40	33.32	32.24	31.16	30.08	29.00	27.92
100 PWL	0	44.8																				



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Date ambiti 14.30 psia  
Data ambiti 536.0 R  
Data ambiti 70.00%  
Data scale 1

[illegible]



rodent_english_fly_casation	
nalribid	NATP full wedge
ritobid	JER w/ external supplement

mixed	BASE
no2bid	BASE

2002	41.226
2003	35.02

arrind	78 39
scale	4
1	172 00

mg	0.001
mol	0.001
nmol	14.2822

lamb	501.359
rhinoid	85.98

wind	0
1.350	0
1.350	0

npb	1.442
ptc	19.8951
cts	20.5949

per	2.67
walc	14.218

dic	1152.01
md	491.892

pinix	20.4843
rimix	596.269

msipend	0.685024
grvixip	14050 5
hachuan	(04 26)

background:	(2-12-0)
blend	281
update	25 Nov 96

endtime 21:02:03  
DADSdate 97.08.25

DADSlime 21:02:03  
bichdate 25.Nov.96

Scenario: Fly-over, full-scale, 1500' size  
Processing date: Wed 11/21/2001

Data simbol 14.70 psla

Data sample	537.0 A
Data sample	70.00%

Data scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

distance (m)	yaw angle (deg)	roll angle (deg)
183.18	55	0
172.09	60	0

frequency	55	80
58.04	55.69	80

100	56.88	57.97
150	58.45	57.22

180	57.17	57.44
200	58.35	59.47

250	58.22	58.39
320	57.83	58.32
400	55.08	58.22

400	53.66	56.12	59.11
500	54.37	56.12	59.11
600	53.56	55.15	59.11

800	53.16	54.06
1000	52.16	53.44

1300	50.82	52.1
1600	49.3	50.87

2000	47.68	49.44
2500	45.32	47.1
3200	42.5	44.52

2000	42.9	40.82	35.51
4000	38.66	40.82	35.51
5000	32.82	40.82	35.51

6300	23.75	27.88
2000	0	0.04

10000	0	0
QASPL	67.12	68.1

PNL	72.21	73.59
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Date	scale	1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000	1005	1010	1015	1020	1025	1030	1035	1040	1045	1050	1055	1060	1065	1070	1075	1080	1085	1090	1095	1100	1105	1110	1115	1120	1125	1130	1135	1140	1145	1150	1155	1160	1165	1170	1175	1180	1185	1190	1195	1200	1205	1210	1215	1220	1225	1230	1235	1240	1245	1250	1255	1260	1265	1270	1275	1280	1285	1290	1295	1300	1305	1310	1315	1320	1325	1330	1335	1340	1345	1350	1355	1360	1365	1370	1375	1380	1385	1390	1395	1400	1405	1410	1415	1420	1425	1430	1435	1440	1445	1450	1455	1460	1465	1470	1475	1480	1485	1490	1495	1500	1505	1510	1515	1520	1525	1530	1535	1540	1545	1550	1555	1560	1565	1570	1575	1580	1585	1590	1595	1600	1605	1610	1615	1620	1625	1630	1635	1640	1645	1650	1655	1660	1665	1670	1675	1680	1685	1690	1695	1700	1705	1710	1715	1720	1725	1730	1735	1740	1745	1750	1755	1760	1765	1770	1775	1780	1785	1790	1795	1800	1805	1810	1815	1820	1825	1830	1835	1840	1845	1850	1855	1860	1865	1870	1875	1880	1885	1890	1895	1900	1905	1910	1915	1920	1925	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100	2105	2110	2115	2120	2125	2130	2135	2140	2
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prog	290
run	1
test_prog	Alison95
test_num	3
test_facil	LeRC APL
test_cust	Alison
lead_bero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engin	Ray Customer
natidb	NATR full wedge
enbid	IER w/ external woodment

bchtime 21:12:21  
...Scenario: 150 foot arc: 77F, 70%; Full scale: Third-octave SPL  
Processing date: Wed Aug 20 02:12:37 1997

Date: 14.30 pm  
 Date: 536.0 R  
 Date: 70.00%  
 Date: scale

[illegible]



198

ata embi	14.70 psig
ata embi	537.0 ft
ata embi	70.00%

[illegible]



sig	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710</
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Data ambón 14.30 psia  
Data ambón 536 0 H  
Data ambón 70.00%  
Data scale 1

[illegible]



200

Data ambig	14.70 pda
Data ambig	537.0 R
Data ambig	70.00%

[illegible]















[illegible]

Date ambi: 14.70 psia  
Data ambi: 537.0 R  
Data ambi: 70.00%  
Data scale: 1

Observed - year angle (°)	1831.16	1732.05	1655.07	1598.27	1552.91	1523.14	1505.73	1500	1505.73	1523.14	1552.91	1598.27	1655.07	1732.05	1831.16
0	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
1	56	61	66	71	76	81	86	91	96	101	106	111	116	121	126
2	57	62	67	72	77	82	87	92	97	102	107	112	117	122	127
3	58	63	68	73	78	83	88	93	98	103	108	113	118	123	128
4	59	64	69	74	79	84	89	94	99	104	109	114	119	124	129
5	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130
6	61	66	71	76	81	86	91	96	101	106	111	116	121	126	131
7	62	67	72	77	82	87	92	97	102	107	112	117	122	127	132
8	63	68	73	78	83	88	93	98	103	108	113	118	123	128	133
9	64	69	74	79	84	89	94	99	104	109	114	119	124	129	134
10	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135
11	66	71	76	81	86	91	96	101	106	111	116	121	126	131	136
12	67	72	77	82	87	92	97	102	107	112	117	122	127	132	137
13	68	73	78	83	88	93	98	103	108	113	118	123	128	133	138
14	69	74	79	84	89	94	99	104	109	114	119	124	129	134	139
15	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140
16	71	76	81	86	91	96	101	106	111	116	121	126	131	136	141
17	72	77	82	87	92	97	102	107	112	117	122	127	132	137	142
18	73	78	83	88	93	98	103	108	113	118	123	128	133	138	143
19	74	79	84	89	94	99	104	109	114	119	124	129	134	139	144
20	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
21	76	81	86	91	96	101	106	111	116	121	126	131	136	141	146
22	77	82	87	92	97	102	107	112	117	122	127	132	137	142	147
23	78	83	88	93	98	103	108	113	118	123	128	133	138	143	148
24	79	84	89	94	99	104	109	114	119	124	129	134	139	144	149
25	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150
26	81	86	91	96	101	106	111	116	121	126	131	136	141	146	151
27	82	87	92	97	102	107	112	117	122	127	132	137	142	147	152
28	83	88	93	98	103	108	113	118	123	128	133	138	143	148	153
29	84	89	94	99	104	109	114	119	124	129	134	139	144	149	154
30	85	90	95	100	105	110	115	120	125	130	135				



[illegible]



OASPL	66.21
PMU	72.13



207

Data ambir	14.30 psia
Data ambir	538.0 R
Data ambir	70.00%
Data scale	1

roll angle (°)	yaw angle (°)
0	55

100	81.56
130	84.73
160	

320	84.66
400	84.39

800	82.31
1000	81.65
1300	81.55

2500	80.44
3200	80.35

6300	76.72
8000	75.84
10000	73.83



NASA Lewis Mission AST Jet Noise Test 1996

log 292  
run 1  
test\_prog Allison8  
test\_num 1  
test\_date 12/1/96  
test\_cof Allison  
test\_sno Kathy Boyd  
test\_acco Kathy Boyd  
test\_engr Ray Castner  
testid NATR full wedge  
testid JETR w/ external supplement  
testid BASE  
testid BASE  
anot 4.226  
anot 35.03  
anot 74.39  
scale 4  
vol 890.84  
m01 0.19772  
pamb 14.242  
lamb 501.042  
rhumb 88.56  
windst 1.746  
rhoc 1.822  
rho 24.8096  
pb 25.9632  
wactb 3.418  
wactb 18.658  
rc 1382.29  
rc 496.991  
prru 25.7689  
prru 631.899  
maprd 22123.3  
maprd 22123.3  
bathen (pd,20)  
bgrnd 282  
secdate 25 Nov 96  
secdate 21:26:22  
DAESdate 97 06 18  
DAESdate 21:26:22  
bchdate 25 Nov 96  
bchdate 21:26:22  
Scenario Fly-over, full-scale, 15000 altitude, standard day  
Processing date Wed Aug 20 02:15:26 1997

Data amb: 14.70 psia  
Data amb: 537.0 Pa  
Data amb: 70.00%  
Data scale 1

distances: {	1831.16	1732.05	1655.07	1596.27	1552.91	1523.14	1505.72	1500	1505.72	1523.14	1552.91	1596.27	1655.07	1732.05	1831.16	1958.11	2121.32	2333.58	2815.17	3000	3549.3	4395.71	5795.55
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
freq	55	60	65	70	75	80	85	90	95	100</													







prog	296
run	1
test_prog	Alison86
test_num	3
test_fac1	LeRC APL
test_curl	Alison
test_hero	Kathy Boyd
test_kerry	Kathy Boyd
test_engr	Ray Cushman
test_natr	NATR full wedge
test_jer	JER w/ external supplement

bctchime 21:53:48  
 \*\*\*Scenario: Fly-over, full-scale, 1500' altitude, standard day  
 Processing date: Wed Aug 20 02:19:22 1997

Data sembla 14.70 paisa

Debit amount	70.00%
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**Estimate:** \$979.98

roll angle (°)	yaw angle (°)
0	55

Frequency	0
32	0

183

100	35.98
200	40

40.46 40.84  
23 38

500 39.48

800	36.999
1000	34.5

1300	31.53
1800	25.39

2000	20.78
2500	22.66

1000	0
4000	0

**0000**

10000  
OASPL 40.17

1

[illegible]















214







216

Date: 2001.14.70	pos
Date: 2001.537.0	A
Date: 2001.70.00	%
Date: 2001.1	scale



## **100%L, 12CL**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L



218

0.5% CASPIL



[illegible]



220

Scanned: 150 40  
Processing date:

Data ambici	14.30 pela
Data ambici	536.0 R
Data ambici	70.00%
Data scale	1

Distance (ft)

10000	63.84	90.13	90.58	91.03	91.
OASPL	89.41	90.13	90.58	91.03	91.











rog	417
run	1
test_prog	Alison96
test_num	3
test_local	LeRC API
test_cust	Alison
test_aero	Kathy Boyd
test_acou	Kathy Boyd
test_engr	Ray Castner
material	NATR full wedge
enbid	JER w/ external supplement

Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Wed Aug 20 04:58:10 1997  
 Processing date:

Data ambient	14.70 psia
Data ambient	537.0 A
Data ambient	70.00%
Data scale	1

[illegible]















## NASA/CR—2002-210823/VOL2

227

[illegible]



228

Data ends 14.30 data	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	15
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421	1	ALLSPRNG
422	1	ALLSPRNG
423	1	ALLSPRNG
424	1	ALLSPRNG
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541	1	ALLSPRNG
542	1	ALLSPRNG
543	1	ALLSPRNG
544	1	ALLSPRNG

Mon Aug 18 17:15:12 1997

Scanning: Fly-by  
Processing date:

Nett: 14.70 €

Date: 05/11/2011 10:37:00 AM

Date	70.00%
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Data source

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distance: { 1831.16
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55 0

ACQUITTAL

47.41  
80

100	47.05
120	48.42

130	48.63
180	48.74

200	49.51
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250	51.05
130	60.88

320	39.87
400	49.81

500 49.51

630	49.03
600	48.08

300	40.00
1000	46.66

1300	45.79
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1600	41.85
2000	42.84

40.41

3200	37.26
3000	36.50
2800	35.75
2600	35.00
2400	34.25
2200	33.50
2000	32.75
1800	32.00
1600	31.25
1400	30.50
1200	29.75
1000	29.00
800	28.25
600	27.50
400	26.75
200	26.00
0	25.25

4000	32.38
5000	24.74

6300 0

	0	1	2	3	4	5	6	7	8	9
0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001
1	1010	1011	1100	1101	1110	1111	2000	2001	2010	2011
2	2100	2101	2110	2111	2200	2201	2210	2211	2300	2301
3	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311
4	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321
5	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331
6	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341
7	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351
8	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361
9	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371

0	10000	60.39
OASPL		

PNL 67.87

[illegible]







ing	422	
run	1	Alison96
test_prog		
test_num	3	
test_fac1		LEPC APL
test_cust		Alison
lead_hero		Kathy Boyd
lead_acou		Kathy Boyd
lead_engr		Ray Casner
natrod		NATR full wedge
		IFER w/ external supplement

17:23:13  
 Scenario: Fly-over, full-scale, 1500' sideview, standard day  
 Mon Aug 18 17:18:14 1997  
 Processing date:

Data ambient: 14.70 psia  
Data ambient: 537.0 F  
Data ambient: 70.00%  
Data scale: 1

[illegible]







Age	Sex	Group	Allegation	1
1	Male	1st group	Allegation	119
2	Female	2nd group	Allegation	1
3	Male	3rd group	Allegation	3
4	Male	4th group	Allegation	1
5	Male	5th group	Allegation	1
6	Male	6th group	Allegation	1
7	Male	7th group	Allegation	1
8	Male	8th group	Allegation	1
9	Male	9th group	Allegation	1
10	Male	10th group	Allegation	1
11	Male	11th group	Allegation	1
12	Male	12th group	Allegation	1
13	Male	13th group	Allegation	1
14	Male	14th group	Allegation	1
15	Male	15th group	Allegation	1
16	Male	16th group	Allegation	1
17	Male	17th group	Allegation	1
18	Male	18th group	Allegation	1
19	Male	19th group	Allegation	1
20	Male	20th group	Allegation	1
21	Male	21st group	Allegation	1
22	Male	22nd group	Allegation	1
23	Male	23rd group	Allegation	1
24	Male	24th group	Allegation	1
25	Male	25th group	Allegation	1
26	Male	26th group	Allegation	1
27	Male	27th group	Allegation	1
28	Male	28th group	Allegation	1
29	Male	29th group	Allegation	1
30	Male	30th group	Allegation	1
31	Male	31st group	Allegation	1
32	Male	32nd group	Allegation	1
33	Male	33rd group	Allegation	1
34	Male	34th group	Allegation	1
35	Male	35th group	Allegation	1
36	Male	36th group	Allegation	1
37	Male	37th group	Allegation	1
38	Male	38th group	Allegation	1
39	Male	39th group	Allegation	1
40	Male	40th group	Allegation	1
41	Male	41st group	Allegation	1
42	Male	42nd group	Allegation	1
43	Male	43rd group	Allegation	1
44	Male	44th group	Allegation	1
45	Male	45th group	Allegation	1
46	Male	46th group	Allegation	1
47	Male	47th group	Allegation	1
48	Male	48th group	Allegation	1
49	Male	49th group	Allegation	1
50	Male	50th group	Allegation	1
51	Male	51st group	Allegation	1
52	Male	52nd group	Allegation	1
53	Male	53rd group	Allegation	1
54	Male	54th group	Allegation	1
55	Male	55th group	Allegation	1
56	Male	56th group	Allegation	1
57	Male	57th group	Allegation	1
58	Male	58th group	Allegation	1
59	Male	59th group	Allegation	1
60	Male	60th group	Allegation	1
61	Male	61st group	Allegation	1
62	Male	62nd group	Allegation	1
63	Male	63rd group	Allegation	1
64	Male	64th group	Allegation	1
65	Male	65th group	Allegation	1
66	Male	66th group	Allegation	1
67	Male	67th group	Allegation	1
68	Male	68th group	Allegation	1
69	Male	69th group	Allegation	1
70	Male	70th group	Allegation	1
71	Male	71st group	Allegation	1
72	Male	72nd group	Allegation	1
73	Male	73rd group	Allegation	1
74	Male	74th group	Allegation	1
75	Male	75th group	Allegation	1
76	Male	76th group	Allegation	1
77	Male	77th group	Allegation	1
78	Male	78th group	Allegation	1
79	Male	79th group	Allegation	1
80	Male	80th group	Allegation	1
81	Male	81st group	Allegation	1
82	Male	82nd group	Allegation	1
83	Male	83rd group	Allegation	1
84	Male	84th group	Allegation	1
85	Male	85th group	Allegation	1
86	Male	86th group	Allegation	1
87	Male	87th group	Allegation	1
88	Male	88th group	Allegation	1
89	Male	89th group	Allegation	1
90	Male	90th group	Allegation	1
91	Male	91st group	Allegation	1
92	Male	92nd group	Allegation	1
93	Male	93rd group	Allegation	1
94	Male	94th group	Allegation	1
95	Male	95th group	Allegation	1
96	Male	96th group	Allegation	1
97	Male	97th group	Allegation	1
98	Male	98th group	Allegation	1
99	Male	99th group	Allegation	1















rdg	425	
run	1	Atkinson
test_prog		Atkinson
test_num	3	
test_lead		LoRC APPL
test_cust		Allison
test_sero		Kathy Boyd
test_acou		Kathy Boyd
test_engr		Ray Cassner
natrid		NATR full wedge
ncrid		JER w/ external supplement

Scenario: Fly-over, full scale, 1500' altitude, standard day  
Wed Aug 27 10:51:48 1997  
Emulation date: 17:52:52

Data ambt 14.70 psia  
 Data ambt 537.0 F  
 Data ambt 70.00%  
 Data scale 1

[illegible]















rdg	428
run	1
test_prog	Alison96
test_num	3
test_fac1	LaRC APPL
test_fac2	Alison
test_cust	Alison
lead_hero	Kathy Boyd
lead_about	Kathy Boyd
lead_engr	Ray Cassner
material	NATR full wedge
probid	JFR art metal supplement

bchtime 18:05:14  
 --Scenario: Fly-over, full-scale, 1500' altitude, standard day  
 Mon Aug 18 15:40:45 1997  
 Procession date:

Data ambis 14.70 pela  
Data ambis 537.0 R  
Data ambis 70.00%  
Data scale 1

[illegible]



## **100%L, 12UH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L







244

Data ambli	14.70 paisa
Data ambli	537.0 A
Data ambli	70.00%
Data scale	1

[illegible]



Distance, $\ell$	view angle	rot angle	frequency
150	55	55	71.45
100	74.17		100
55	75.17		130
	76.28		180
	76.83		200
	77.62		250
	78.12		320
	77.43		400
	76.06		500
	77.57		630
	78.22		800
	76.99		1000
	76.36		1300
	79.19		1800
	78.43		2000
	77.62		2500
	77.08		3200
	76.71		4000
	76.47		5000
	76.44		6300
	76.58		8000
	74.81		10000
	90.68		OASPI























[illegible]



rag	145
run	1
test_prog	Alison98
test_num	3
test_fac1	LafC APL
test_cust	Allison
test_sero	Kathy Boyd
test_acou	Kathy Boyd
test_engin	Ray Cassner
natrid	NATR full wedge
supplem	JER w/a dental supplement

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Data ambig 14.70 psia  
Data ambig 537.0 R  
Data ambig 70.00%  
Data scale 1

[illegible]



[illegible]

Data ambu	14.30 psia
Data ambu	536.0 R
Data ambu	70.00%
Data ambu	1

[illegible]











NASA Lewis Allison AST Jet Noise Test 1995

noq 143  
 run 1  
 test\_prog Allison8  
 test\_id 3  
 test\_fac LeRC APL  
 test\_cdr Allison  
 lead\_tech Kathy Boyd  
 lead\_accu Kathy Boyd  
 lead\_engr Ray Casner  
 runbid NATR full wedge  
 ngbds JER w/ external supplement  
 modbid ADN  
 modbid BASE 226  
 test 143  
 test 35 02  
 test 78.39  
 scale 4  
 vd 960.23  
 m01 0.20284  
 pamb 14.1972  
 lamb 498.731  
 rhumbd 64.59  
 wends1 0  
 rpe 1.541  
 rpe 1.611  
 pac 21.8779  
 pb 22.8717  
 wacsc 3.157  
 wacsc 16.172  
 itc 1322.51  
 itc 505.16  
 pmix 22.7064  
 fmax 638.688  
 mprad 0.176625  
 bndchan 16000.5  
 bndchan (26)  
 bndchan 133  
 moddate 19 Nov 96  
 acstime 17:20:22  
 DAUSdate 97 06 19  
 DAUSTime 17:20:22  
 bnddate 19 Nov 96  
 bndtime 17:20:22  
 Scenario Fly-over, full scale, 15000 sidings, standard day  
 Processing date: Mon Aug 16 17:25:30 1997

Data ambid 14.70 psia

Data ambid 537.0 R

Data ambid 70.00%

Data scale 1

Data scale 1

Data scale 1

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258

Data ambig	14.70 psia
Data ambig	537.0 R
Data ambig	70.00%
Data scale	1

Distance (yr)	1831.16	1732.05	1655.07	1598.27	1552.91	1523.14	1505.73	1500	1506.75	1523.14	1552.91	1598.27	1655.07	1732.05	1831.16	1958.11	2121.30	2353.59	2615.17	3000	3548.3	4365.71	5795.55
year angle (°)	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	185
frequency	55	59	63	67	71	75	79	83	87	91	95	99	103	107	111	115	119	123	127	131	135	139	165
100	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
150	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
200	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
250	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
300	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
350	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
400	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
450	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
500	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
550	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
600	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
650	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
700	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
750	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.37	50.89	50.41	49.93	49.45	48.97	48.49	48.01	47.53	
800	57.61	57.13	56.65	56.17	55.69	55.21	54.73	54.25	53.77	53.29	52.81	52.33	51.85	51.3									







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test_prog	Alison66
test_num	3
test_test	LeRC APL
test_cst	Alison
test_sero	Kathy Boyd
test_sco	Kathy Boyd
test_engr	Ray Casner
rainfall	NATR full wedge
robbit	JER w/epidemiol supplement

bedtime 18:09:15  
 \*\*Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Processing date: Wed Aug 27 00:48:23 1997

Data ambli	14.30 psia
Data ambli	536.0 R
Data ambli	70.00%
Data scala	1

**0869**

distancias: (i)

roll angle (°)	yaw angle (°)
0	55

frequency	55
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00  
88

100 0  
130 65 49

150 65.30

200 68.24

250	70.84
320	72.61

320	72.06
400	72.07

500	73.75
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830	74.28
800	78.43

800	76.49
1000	77.49

1300	70.75
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1600	70.15
2000	70.27

2000	70.21
2500	77.11

3200 77.07

4000	76.94
5000	79.27

77.25

8000 77.62

00000 77.05 82.98  
OASPI

Chart 1



[illegible]







ordg	148
run	1
test_prog	Atmosf6
test_num	3
test_fac1	LeRC API
test_cust	Allison
test_sero	Kathy Boyd
test_acou	Kathy Boyd
test_engr	Rory Cashner
material	NATR fuel wedge
product	JER w/ external supplement

ADW	made	BASE
madid	41,226	
madot	35,92	
maduc	76,93	
madu	4	
scale	940,64	
mad	0	
mad1	0,93085	
mad2	14,1448	
lamb	495,214	
thum	68,9	
wad1	0	
wad2	1,539	
wad3	1,612	
wad4	21,715	
wad5	22,4014	
wad6	2,509	
wad7	16,989	
wad8	1,322,02	
wad9	503,827	
wad10	22,6419	
wad11	630,033	
wad12	0,764359	
wad13	18,25,91	
wad14	134	
wad15	19,Nov,98	
wad16	18,2119	
wad17	DAUSLINE	
wad18	18,2119	
wad19	19,Nov,98	
wad20	18,2119	
wad21	18,2119	
wad22	18,2119	
wad23	18,2119	
wad24	18,2119	
wad25	18,2119	
wad26	18,2119	
wad27	18,2119	
wad28	18,2119	
wad29	18,2119	
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wad90	18,2119	
wad91	18,2119	
wad92	18,2119	
wad93	18,2119	
wad94	18,2119	
wad95	18,2119	
wad96	18,2119	
wad97	18,2119	
wad98	18,2119	
wad99	18,2119	
wad100	18,2119	

Data embdi	14.70 pais
Data embdi	537.0 R
Data embdi	70.00%
Data scale	!

[illegible]







## NASA/CR—2002-210823/VOL2

266



## **100%L, 12TH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L







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bedtime 18:38:18  
 --Scenario: Fly-over, full-scale, 1500 sideline, standard day  
 Processing date: Wed Aug 20 04:14:34 1997

Data ambi	14.70 psda
Data ambi	537.0 F
Data ambi	70.00%
Data scale	1

[illegible]



270

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	52
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[illegible]

Data ambis	14.70 psia
Data ambis	537.0 ft
Data ambis	70.00%
Data scale	1

distance (km)	1831.16	1720.05	1653.07	1598.27	1552.81	1523.14	1505.73	1500	1505.73	1523.14	1552.81	1598.27	1653.07	1732.05	1831.16	1928.11	2121.32	2303.59	2615.17	3000	3549.8	43085.7	57995.8
net angle (°)	55	80	85	70	75	80	85	90	85	80	100	110	115	120	125	130	135	140	145	150	155	160	165
frequency	55	80	65	70	75	90	85	90	85	80	100	110	115	120	125	130	135	140	145	150	155	160	165
100	51.11	52.19	52.7	53.06	53.53	54.71	54.71	55.84	55.84	57.12	57.97	59.10	59.69	60.76	61.81	62.84	63.94	64.55	65.15	65.74	66.33	66.92	67.51
150	50.82	52.41	53.06	54.86	55.36	56.78	56.78	58.24	58.24	59.72	60.68	62.19	62.84	64.35	65.84	67.33	68.82	69.31	70.80	71.29	71.88	72.47	73.06
200	50.21	51.81	52.47	54.66	55.28	56.84	56.84	58.44	58.44	60.08	60.99	62.66	63.42	65.12	66.84	68.56	70.28	71.99	73.71	75.43	77.15	78.87	80.59
250	50.34	52.07	52.77	55.17	55.83	57.57	57.57	59.38	59.38	61.24	62.16	64.05	64.99	66.96	68.94	70.92	72.90	74.88	76.86	78.84	80.82	82.80	84.78
300	50.54	52.36	53.06	55.67	56.43	58.24	58.24	60.12	60.12	62.04	63.02	65.00	65.99	68.04	69.99	72.04	74.09	76.14	78.19	80.24	82.29	84.34	86.39
350	50.51	52.55	53.26	55.85	56.67	58.57	58.57	60.54	60.54	62.54	63.59	65.66	66.68	68.84	70.84	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84
400	50.31	52.60	53.33	56.25	57.10	59.01	59.01	61.04	61.04	63.12	64.24	66.41	67.46	69.72	71.84	73.94	76.04	78.14	80.24	82.34	84.44	86.54	88.64
450	50.46	52.85	53.68	56.58	57.55	59.52	59.52	61.58	61.58	63.72	64.91	67.18	68.30	70.66	72.84	75.04	77.24	79.44	81.64	83.84	86.04	88.24	90.44
500	50.46	52.84	53.68	56.58	57.55	59.52	59.52	61.58	61.58	63.72	64.91	67.18	68.30	70.66	72.84	75.04	77.24	79.44	81.64	83.84	86.04	88.24	90.44
550	50.50	52.88	53.71	56.64	57.61	59.64	59.64	61.72	61.72	63.84	65.07	67.34	68.48	70.84	73.04	75.24	77.44	79.64	81.84	84.04	86.24	88.44	90.64
600	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
650	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
700	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
750	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
800	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
850	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
900	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
950	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1000	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1050	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1100	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1150	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1200	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1250	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1300	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1350	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1400	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1450	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1500	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1550	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1600	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1650	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1700	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1750	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1800	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1850	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1900	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
1950	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2000	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2050	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2100	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2150	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2200	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2250	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2300	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2350	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2400	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2450	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61.64	61.64	63.76	64.99	67.26	68.41	70.76	72.94	75.14	77.34	79.54	81.74	83.94	86.14	88.34	90.54
2500	50.43	52.74	53.54	56.54	57.54	59.57	59.57	61															







[illegible]

Data sample 14.70 psds  
Data sample 537.0 R

Distance	103.18	127.05	155.81	186.27	220.53	261.57	300.0	354.0	438.6	579.5
angle	13.0	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0
roll angle	13.0	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0
frequency	13.0	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0
100	54.18	55.86	57.18	58.24	59.15	59.95	60.65	61.25	61.75	62.15
120	55.35	57.03	58.35	59.41	60.32	61.12	61.82	62.42	62.92	63.32
140	56.52	58.20	59.52	60.58	61.49	62.29	62.99	63.59	64.09	64.49
160	57.69	59.37	60.69	61.75	62.66	63.46	64.16	64.76	65.26	65.66
180	58.86	60.54	61.86	62.92	63.83	64.63	65.33	65.93	66.43	66.83
200	59.95	61.63	62.95	64.01	64.92	65.72	66.42	67.02	67.52	67.92
220	60.95	62.63	63.95	65.01	65.92	66.72	67.42	68.02	68.52	68.92
240	61.86	63.54	64.86	65.92	66.83	67.63	68.33	68.93	69.43	69.83
260	62.77	64.45	65.77	66.83	67.74	68.54	69.24	69.84	70.34	70.74
280	63.68	65.36	66.68	67.74	68.65	69.45	70.15	70.75	71.25	71.65
300	64.59	66.27	67.59	68.65	69.56	70.36	71.06	71.66	72.16	72.56
320	65.50	67.18	68.50	69.56	70.47	71.27	71.97	72.57	73.07	73.47
340	66.41	68.09	69.41	70.47	71.38	72.18	72.88	73.48	73.98	74.38
360	67.32	69.00	70.32	71.38	72.29	73.09	73.79	74.39	74.89	75.29
380	68.23	69.91	71.23	72.29	73.20	74.00	74.70	75.30	75.80	76.20
400	69.14	70.82	72.14	73.20	74.11	74.91	75.61	76.21	76.71	77.11
420	70.05	71.73	73.05	74.11	75.02	75.82	76.52	77.12	77.62	78.02
440	70.96	72.64	73.96	75.02	75.93	76.73	77.43	78.03	78.53	78.93
460	71.87	73.55	74.87	75.93	76.84	77.64	78.34	78.94	79.44	79.84
480	72.78	74.46	75.78	76.84	77.75	78.55	79.25	79.85	80.35	80.75
500	73.69	75.37	76.69	77.75	78.66	79.46	80.16	80.76	81.26	81.66
520	74.60	76.28	77.60	78.66	79.57	80.37	81.07	81.67	82.17	82.57
540	75.51	77.19	78.51	79.57	80.48	81.28	81.98	82.58	83.08	83.48
560	76.42	78.10	79.42	80.48	81.39	82.19	82.89	83.49	83.99	84.39
580	77.33	79.01	80.33	81.39	82.30	83.10	83.80	84.40	84.90	85.30
600	78.24	79.92	81.24	82.30	83.21	84.01	84.71	85.31	85.81	86.21
620	79.15	80.83	82.15	83.21	84.12	84.92	85.62	86.22	86.72	87.12
640	80.06	81.74	83.06	84.12	85.03	85.83	86.53	87.13	87.63	88.03
660	80.97	82.65	83.97	85.03	85.94	86.74	87.44	88.04	88.54	88.94
680	81.88	83.56	84.88	85.94	86.85	87.65	88.35	88.95	89.45	89.85
700	82.79	84.47	85.79	86.85	87.76	88.56	89.26	89.86	90.36	90.76
720	83.70	85.38	86.70	87.76	88.67	89.47	90.17	90.77	91.27	91.67
74										















dg	365
run	1
test_prog	Alison98
test_num	3
test_facil	LeRC APL
test_cust	Alison
lead_aero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engr	Ray Casner
material	NATR full wedge
tribol	JER w/ external supplement

bchtime 18:48:54  
 \*\*Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Pmission date: Wed Aug 20 04:11:18 1997

Data ambt 14.70 psia  
Data ambt 537.0 R  
Data ambt 70.00%  
Data scale

datestamp	1831.18	1732.05	1655.07	1598.27	1552.91	1523.14	1505.73	1500	1506.73	1523.14	1552.91	1598.27	1655.07	1732.05	1831.18	1958.11	2121.32	2303.59	2615.17	3000	3549.3	4385.71	5795.55
year angle	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
frequency	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
1	30.90	36.98	38.23	37.25	39.67	38.18	40.84	41.81	40.12	43.08	42.68	42.3	41.81	41.5	41.05	42.56	41.26	40.36	39.64	38.84	38.33	37.45	36.55
2	100	120.25	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35	120.35
3	180	37.26	38.55	39.11	41.08	40.84	42.93	43.63	41.21	42.22	41.72	41.45	41.5	43.58	43.47	43.29	41.74	40.33	41.02	39.8	37.65	36.82	35.12
4	100	37.26	40.82	42	42.85	44.5	45.96	42.86	42.77	43.7	43.86	43.89	43.85	43.48	43.5	44.49	43.06	41.36	40.8	39.8	37.65	36.82	35.12
5	200	42.81	44.77	46.81	47.42	47.12	48.26	45.73	45.74	47.12	47.16	48.48	48.49	48.79	48.67	47.58	45.96	44.37	43.96	42.96	41.79	41.09	39.48
6	250	47.1	49.36	51.16	52.05	52.09	52.31	52.29	48.14	49.45	49.32	50.84	50.99	52.31	52.45	53.17	52.65	51.17	50.85	49.36	47.53	44.79	41.54
7	300	45.95	47.82	49.01	48.45	48.8	49.36	48.33	50.74	52.2	52.6	52.85	52.85	54.3	54.3	54.3	52.76	51.96	50.84	49.48	47.53	44.79	41.54
8	400	43.76	46.52	47.85	48.48	48.95	49.36	48.33	50.74	52.2	52.6	52.85	52.85	54.3	54.3	54.3	52.76	51.96	50.84	49.48	47.53	44.79	41.54
9	500	44.08	46.95	47.86	47.85	48.36	48.77	50.3	50.67	52.09	52.5	52.85	52.85	54.3	54.3	54.3	52.76	51.96	50.84	49.48	47.53	44.79	41.54
10	600	44.27	46.46	47.24	47.1	47.41	47.68	48.98	50.56	52.02	52.5	52.85	52.85	54.3	54.3	54.3	52.76	51.96	50.84	49.48	47.53	44.79	41.54
11	700	44.25	46.44	47.24	47.1	47.41	47.68	48.98	50.56	52.02	52.5	52.85	52.85	54.3	54.3	54.3	52.76	51.96	50.84	49.48	47.53	44.79	41.54
12	800	44.25	46.44	47.24	47.1	47.41	47.68	48.98	50.56	52.02	52.5	52.85	52.85	54.3	54.3	54.3	52.76	51.96	50.84	49.48	47.53	44.79	41.54
13	900	44.25	46.44	47.24	47.1	47.41	47.68	48.98	50.56	52.02	52.5	52.85	52.85	54.3	54.3	54.3	52.76	51.96	50.84	49.48	47.53	44.79	41.54
14	1000	44.25	46.44	47.24	47.1	47.41	47.68	48.98	50.56	52.02	52.5	52.85	52.85	54.3	54.3	54.3	52.76	51.96	50.84	49.48	47.53	44.79	41.54
15	1100	44.25	46.44	47.24	47.1	47.41	47.68	48.98	50.56	52													



freq	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100	2110	2120	2130	2140	2150	2160	2170	2180	2190	2200	2210	2220	2230	2240	2250	2260	2270	2280	2290	2300	2310	2320	2330	2340	2350	2360	2370	2380	2390	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500	2510	2520	2530	2540	2550	2560	2570	2580	2590	2600	2610	2620	2630	2640	2650	2660	2670	2680	2690	2700	2710	2720	2730	2740	2750	2760	2770	2780	2790	2800	2810	2820	2830	2840	2850	2860	2870	2880	2890	2900	2910	2920	2930	2940	2950	2960	2970	2980	2990	3000	3010	3020	3030	3040	3050	3060	3070	3080	3090	3100	3110	3120	3130	3140	3150	3160	3170	3180	3190	3200	3210	3220	3230	3240	3250	3260	3270	3280	3290	3300	3310	3320	3330	3340	3350	3360	3370	3380	3390	3400	3410	3420	3430	3440	3450	3460	3470	3480	3490	3500	3510	3520	3530	3540	3550	3560	3570	3580	3590	3600	3610	3620	3630	3640	3650	3660	3670	3680	3690	3700	3710	3720	3730	3740	3750	3760	3770	3780	3790	3800	3810	3820	3830	3840	3850	3860	3870	3880	3890	3900	3910	3920	3930	3940	3950	3960	3970	3980	3990	4000	4010	4020	4030	4040	4050	4060	4070	4080	4090	4100	4110	4120	4130	4140	4150	4160	4170	4180	4190	4200	4210	4220	4230	4240	4250	4260	4270	4280	4290	4300	4310	4320	4330	4340	4350	4360	4370	4380	4390	4400	4410	4420	4430	4440	4450	4460	4470	4480	4490	4500	4510	4520	4530	4540	4550	4560	4570	4580	4590	4600	4610	4620	4630	4640	4650	4660	4670	4680	4690	4700	4710	4720	4730	4740	4750	4760	4770	4780	4790	4800	4810	4820	4830	4840	4850	4860	4870	4880	4890	4900	4910	4920	4930	4940	4950	4960	4970	4980	4990	5000	5010	5020	5030	5040	5050	5060	5070	5080	5090	5100	5110	5120	5130	5140	5150	5160	5170	5180	5190	5200	5210	5220	5230	5240	5250	5260	5270	5280	5290	5300	5310	5320	5330	5340	5350	5360	5370	5380	5390	5400	5410	5420	5430	5440	5450	5460	5470	5480	5490	5500	5510	5520	5530	5540	5550	5560	5570	5580	5590	5600	5610	5620	5630	5640	5650	5660	5670	5680	5690	5700	5710	5720	5730	5740	5750	5760	5770	5780	5790	5800	5810	5820	5830	5840	5850	5860	5870	5880	5890	5900	5910	5920	5930	5940	5950	5960	5970	5980	5990	6000	6010	6020	6030	6040	6050	6060	6070	6080	6090	6100	6110	6120	6130	6140	6150	6160	6170	6180	6190	6200	6210	6220	6230	6240	6250	6260	6270	6280	6290	6300	6310	6320	6330	6340	6350	6360	6370	6380	6390	6400	6410	6420	6430	6440	6450	6460	6470	6480	6490	6500	6510	6520	6530	6540	6550	6560	6570	6580	6590	6600	6610	6620	6630	6640	6650	6660	6670	6680	6690	6700	6710	6720	6730	6740	6750	6760	6770	6780	6790	6800	6810	6820	6830	6840	6850	6860	6870	6880	6890	6900	6910	6920	6930	6940	6950	6960	6970	6980	6990	7000	7010	7020	7030	7040	7050	7060	7070	7080	7090	7100	7110	7120	7130	7140	7150	7160	7170	7180	7190	7200	7210	7220	7230	7240	7250	7260	7270	7280	7290	7300	7310	7320	7330	7340	7350	7360	7370	7380	7390	7400	7410	7420	7430	7440	7450	7460	7470	7480	7490	7500	7510	7520	7530	7540	7550	7560	7570	7580	7590	7600	7610	7620	7630	7640	7650	7660	7670	7680	7690	7700	7710	7720	7730	7740	7750	7760	7770	7780	7790	7800	7810	7820	7830	7840	7850	7860	7870	7880	7890	7900	7910	7920	7930	7940	7950	7960	7970	7980	7990	8000	8010	8020	8030	8040	8050	8060	8070	8080	8090	8100	8110	8120	8130	8140	8150	8160	8170	8180	8190	8200	8210	8220	8230	8240	8250	8260	8270	8280	8290	8300	8310	8320	8330	8340	8350	8360	8370	8380	8390	8400	8410	8420	8430	8440	8450	8460	8470	8480	8490	8500	8510	8520	8530	8540	8550	8560	8570	8580	8590	8600	8610	8620	8630	8640	8650	8660	8670	8680	8690	8700	8710	8720	8730	8740	8750	8760	8770	8780	8790	8800	8810	8820	8830	8840	8850	8860	8870	8880	8890	8900	8910	8920	8930	8940	8950	8960	8970	8980	8990	9000	9010	9020	9030	9040	9050	9060	9070	9080	9090	9100	9110	9120	9130	9140	9150	9160	9170	9180	9190	9200	9210	9220	9230	9240	9250	9260	9270	9280	9290	9300	9310	9320	9330	9340	9350	9360	9370	9380	9390	9400	9410	9420	9430	9440	9450	9460	9470	9480	9490	9500	9510	9520	9530	9540	9550	9560	9570	9580	9590	9600	9610	9620	9630	9640	9650	9660	9670	9680	9690	9700	9710	9720	9730	9740	9750	9760	9770	9780	9790	9800	9810	9820	9830	9840	9850	9860	9870	9880	9890	9900	9910	9920	9930	9940	9950	9960	9970	9980	9990	10000
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prog	382
unit	1
test_prog	Alison98
test_num	3
test_facil	LEPC APL
test_cust	Alison
read_sero	Kathy Boyd
read_accu	Kathy Boyd
read_angle	Ray Casner
read	NATR nut wedge
troub	WER w/ external supplement

bedtime 18:17:08  
 ---Scenario: Fry-over, full-scale, 1500' sideline, standard day  
 Processing date: Mon Aug 18 10:00:51 1997

Data ambisi	14.70 peia
Data ambisi	537.0 R
Data ambisi	70.00%
Data scale	1

[illegible]



[illegible]



## NASA Lewis Allison AST Jet Nozzle Test 1996

rdg	375
run	1
test_prog	Alkanoid
test_num	3
test_lack	LePC API
test_cust	Alkan
test_aero	Kathy Boyd
test_acos	Kathy Boyd
test_engr	Ray Custer
test_ful	NATR full wedge
test_wl	JER w/ external supplement

bchtime 15:25:48  
 -----Scenario: Fly-over, full scale, 1500' altitude, standard day  
 Processing date: Wed Aug 20 04:02:09 1997

**Scenario: Fly-over**  
**Processing date:**

Data अभी 14.70 Data

Data number 537.0 A

Date: 10/10/2010	70.00%	1
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distance: (l) 1831.16

yaw angle  
roll angle (

frequency

32

100 000

139

180	43.8
200	44.78

230	46.38
250	47.18

420  
320

400	44.23
500	47.38

43 43

800 4358

1000	42.96
1300	42.12

1500	40.48
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2000	30.71
2001	30.40

2500	29.83
3200	29.83

4000 2005

5000 6200

0000

10000 0

OASPL	54.76
PM	63.21

11



rdg	379
run	1
test_prog	Allison88
test_num	3
test_lack	LaRC APL
test_cust	Kathy Boyd
test_zero	Kathy Boyd
test_accu	Kathy Boyd
test_engr	Ray Cassner
test_wedge	NATR full wedge
test_supplement	FER w/external supplement

Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
Processing date: Mon Aug 18 10:11:28 1997  
bchtime 15:44:48

Data arrivo	14.30	pesa
Data arrivo	538.0	R
Data arrivo	70.00%	

[illegible]



287

"Scenario: Fly-over  
Processing date:

Data arrivo	14 70 mila
Data arrivo	537 0 R
Data arrivo	70 00%
Data arrivo	!

[illegible]

OASPL  
PNL



dog	360
run	1
test_prog	Allison6
test_num	3
test_fac1	LERC API
test_cust	Allison
read_aero	Kathy Boyd
read_scout	Kathy Boyd
read_engr	Ray Casner
mailbid	NATR bul wedge
mod1	JER w/ external supplement

	BASE	TONG
musab	41.226	
musab2	35.02	
musab3	78.39	
musab4		
musab5	4	
musab6	950.25	
musab7	0.30018	
musab8	14.1987	
musab9	501.482	
musab10	76.22	
musab11	15.45	
musab12	18.12	
musab13	21.837	
musab14	22.8853	
musab15	3.108	
musab16	15.146	
musab17	1323.01	
musab18	503.237	
musab19	22.7263	
musab20	642.815	
musab21	0.764477	
musab22	17346.4	
musab23	[0.729]	
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musab26	603.32	
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musab118	603.32	
musab119	603.32	
musab12		

Data ambte	14.30 pole
Data ambte	598.0 R
Data ambte	70.00%
Data scale	1

distance: (1) 150

exit angle	0	55
exit angle (°)	0	55

frequency	55
80	71.50
100	71.02

100	71.93
130	72.89
160	73.7

100	73.62
200	78.2

320	79.34
400	78.93

500	80.14
830	81.22

800	\$2.28
1000	\$4.39
1300	\$5.28

1300	65.26
1800	66.17
2000	66.38

2500	85.64
3200	84.79

4000	83.68
5000	82.48

6300	81.43
8000	79.8
15000	75.60

10000	77.38
OASPL	95.48

%; Full scale; Third-octave SPL  
Mon Aug 18 10:14:11 1997

Delta ambig	14,30 para
Data ambig	536,0 A
Data ambig	70,00%

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Data scale	

distance: (1	150
view angle	55

rad angle (°)	frequency
0	55
55	55
90	55

80	71.53
100	71.93
130	72.88

150	72.06
160	73.7
200	73.82

250	78.2
320	79.34

400	78.93
500	80.14

830	81.22
800	82.26
...	...

1000	84.39
1300	85.28
1600	86.17

1000	86.17
2000	86.38
2500	85.64

3200	84.79
4000	83.68

5000	82.48
6300	81.43

8000	79.5
10000	77.56
21581	95.48

UNSAFE  
03:43

75: 70%; Full scale; Third-octave SPL  
Mon Aug 18 10:14:11 1997

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[illegible]



NASA Lewis Allison AST Jet Noise Test 1998

[illegible]

Data arrivo	14.30 passa
Data arrivo	5.38.0 FI
Data arrivo	70.00%
Data arrivo	1

[illegible]



[illegible]



## **100%L, 16UH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L



[illegible]

Data ambig	14.30 psia
Data ambig	536.0 R
Data ambig	70.00%
Data scale	1

distance: (1) 150

new angle!

real angle (

Frequency	32	37
10	10	10
20	20	20
30	30	30
40	40	40
50	50	50
60	60	60
70	70	70
80	80	80
90	90	90
100	100	100

80 82.31  
100 82.47

130 65.4

160 85.13

200 88.16

250 69.01

320 64.72

400	63.94
500	67.57

500	67.67
600	66.97

630	63.07
600	62.67

1000	67 19
500	67 19

1300 68.00

1600 85 55

2000	54.7
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2500 64.01

3200 63.3

40000	\$2.08
50000	\$1.11

909 0005  
6113 0005

0000	0000
0000	0000

100000  
59.36

OASPL	78.95
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Data amb 14.70 pda	
Data amb 537.0 R	
Data amb 70.00%	
Data scale	1



295

[illegible]



rog	102
run	1
test_prog	Alkison86
test_num	3
test_fac1	LeRC AP1
test_cust	Alkison
test_sero	Kathy Boyd
test_scou	Kathy Boyd
test_engr	Ray Cassner
rold	NATR full wedge
rold	JER full external supplement

bchtime 18:02:47  
 \*\*Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Mon Aug 18 11:08:08 1997

Date ambient 14.70 psia  
Date ambient 537.0 R  
Date ambient 70.00%  
Date scale 1

Distance (km)	Frequency	1831.16	1720.55	1625.07	1590.27	1552.81	1523.14	1505.73	1485.14	1465.73	1445.14	1425.14	1405.14	1385.14	1365.14	1345.14	1325.14	1305.14	1285.14	1265.14	1245.14	1225.14	1205.14	1185.14	1165.14	1145.14	1125.14	1105.14	1085.14	1065.14	1045.14	1025.14	1005.14	985.14	965.14	945.14	925.14	905.14	885.14	865.14	845.14	825.14	805.14	785.14	765.14	745.14	725.14	705.14	685.14	665.14	645.14	625.14	605.14	585.14	565.14	545.14	525.14	505.14	485.14	465.14	445.14	425.14	405.14	385.14	365.14	345.14	325.14	305.14	285.14	265.14	245.14	225.14	205.14	185.14	165.14	145.14	125.14	105.14	85.14	65.14	45.14	25.14	5.14
0	1	1831.16	1720.55	1625.07	1590.27	1552.81	1523.14	1505.73	1485.14	1465.73	1445.14	1425.14	1405.14	1385.14	1365.14	1345.14	1325.14	1305.14	1285.14	1265.14	1245.14	1225.14	1205.14	1185.14	1165.14	1145.14	1125.14	1105.14	1085.14	1065.14	1045.14	1025.14	1005.14	985.14	965.14	945.14	925.14	905.14	885.14	865.14	845.14	825.14	805.14	785.14	765.14	745.14	725.14	705.14	685.14	665.14	645.14	625.14	605.14	585.14	565.14	545.14	525.14	505.14	485.14	465.14	445.14	425.14	405.14	385.14	365.14	345.14	325.14	305.14	285.14	265.14	245.14	225.14	205.14	185.14	165.14	145.14	125.14	105.14	85.14	65.14	45.14	25.14	5.14
100	100	1831.16	1720.55	1625.07	1590.27	1552.81	1523.14	1505.73	1485.14	1465.73	1445.14	1425.14	1405.14	1385.14	1365.14	1345.14	1325.14	1305.14	1285.14	1265.14	1245.14	1225.14	1205.14	1185.14	1165.14	1145.14	1125.14	1105.14	1085.14	1065.14	1045.14	1025.14	1005.14	985.14	965.14	945.14	925.14	905.14	885.14	865.14	845.14	825.14	805.14	785.14	765.14	745.14	725.14	705.14	685.14	665.14	645.14	625.14	605.14	585.14	565.14	545.14	525.14	505.14	485.14	465.14	445.14	425.14	405.14	385.14	365.14	345.14	325.14	305.14	285.14	265.14	245.14	225.14	205.14	185.14	165.14	145.14	125.14	105.14	85.14	65.14	45.14	25.14	5.14
200	200	1831.16	1720.55	1625.07	1590.27	1552.81	1523.14	1505.73	1485.14	1465.73	1445.14	1425.14	1405.14	1385.14	1365.14	1345.14	1325.14	1305.14	1285.14	1265.14	1245.14	1225.14	1205.14	1185.14	1165.14	1145.14	1125.14	1105.14	1085.14	1065.14	1045.14	1025.14	1005.14	985.14	965.14	945.14	925.14	905.14	885.14	865.14	845.14	825.14	805.14	785.14	765.14	745.14	725.14	705.14	685.14	665.14	645.14	625.14	605.14	585.14	565.14	545.14	525.14	505.14	485.14	465.14	445.14	425.14	405.14	385.14	365.14	345.14	325.14	305.14	285.14	265.14	245.14	225.14	205.14	185.14	165.14	145.14	125.14	105.14	85				















rdg	104
run	1
test_prog	Allison
test_num	3
test_facd	Left AP
test_cust	Allison
lead_zer0	Kathy Boyd
lead_acco	Kathy Boyd
lead_engir	Ruby Caster
lead_nut	Wendy
suppl	JER w/ external
modid	supplement

bchtime 16:18:34  
 \*\*\*Scenario: Fly-over, full-scale, 1500 altitude, standard day  
 Processing date: Mon Aug 18 16:54:43 1997

Data ambig	14.70 pct
Data ambig	537.0 Fl
Data ambig	70.00%
Data scale	1

Distance (km)	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	
Frequency	183.16	1722.05	1655.07	1590.27	1552.91	1523.14	1506.73	1500	1505.73	1523.14	1552.91	1590.27	1655.07	1732.05	1831.16	1938.11	2121.32	2303.99	2615.17	3000	3549.73	4386.71	5795.55								
Yaw angle (deg)	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
Amplitude (dB)	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
Phase (deg)	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
Power (W)	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
SNR (dB)	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
BER	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
QPSK	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
QAM	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
BER	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
QPSK	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
QAM	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
BER	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
QPSK	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165								
QAM	55	80	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	14													



rdg	106
run	1
test_prog	Allison06
test_num	3
test_incl	LoRC APL
test_cust	Allison
lead_aero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engin	Ray Cassner
natrid	NATR full wedge
ribid	JER w/ external supplement

biotime 16:50:33  
 --Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Processing date: Fri Aug 22 13:28:31 1987

Processing date:

Data until 14.30 pm

Data simbol 538.0 R

Date added	70.00%
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4422 0180

distance: (1

55

Frequency	Percentage
1	55
2	35
3	10

57.81

100 50 45 37 19

130 57.48

180 50.33

200 50.99

250	64.37
220	64.32

320	\$24.32
400	\$27.75

500 64.57

630	63.59
800	84.52

600	64.12
1000	64.12

1300 63.73

1600	85.9
2000	71.07

2000	81.18
2500	81.18

3200 62.78

4000	62.1
5000	61.67

60.27  
6300

5000 59.89

	0.0000	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017	0.0018	0.0019	0.0020	0.0021	0.0022	0.0023	0.0024	0.0025	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0032	0.0033	0.0034	0.0035	0.0036	0.0037	0.0038	0.0039	0.0040	0.0041	0.0042	0.0043	0.0044	0.0045	0.0046	0.0047	0.0048	0.0049	0.0050	0.0051	0.0052	0.0053	0.0054	0.0055	0.0056	0.0057	0.0058	0.0059	0.0060	0.0061	0.0062	0.0063	0.0064	0.0065	0.0066	0.0067	0.0068	0.0069	0.0070	0.0071	0.0072	0.0073	0.0074	0.0075	0.0076	0.0077	0.0078	0.0079	0.0080	0.0081	0.0082	0.0083	0.0084	0.0085	0.0086	0.0087	0.0088	0.0089	0.0090	0.0091	0.0092	0.0093	0.0094	0.0095	0.0096	0.0097	0.0098	0.0099	0.0100	0.0101	0.0102	0.0103	0.0104	0.0105	0.0106	0.0107	0.0108	0.0109	0.0110	0.0111	0.0112	0.0113	0.0114	0.0115	0.0116	0.0117	0.0118	0.0119	0.0120	0.0121	0.0122	0.0123	0.0124	0.0125	0.0126	0.0127	0.0128	0.0129	0.0130	0.0131	0.0132	0.0133	0.0134	0.0135	0.0136	0.0137	0.0138	0.0139	0.0140	0.0141	0.0142	0.0143	0.0144	0.0145	0.0146	0.0147	0.0148	0.0149	0.0150	0.0151	0.0152	0.0153	0.0154	0.0155	0.0156	0.0157	0.0158	0.0159	0.0160	0.0161	0.0162	0.0163	0.0164	0.0165	0.0166	0.0167	0.0168	0.0169	0.0170	0.0171	0.0172	0.0173	0.0174	0.0175	0.0176	0.0177	0.0178	0.0179	0.0180	0.0181	0.0182	0.0183	0.0184	0.0185	0.0186	0.0187	0.0188	0.0189	0.0190	0.0191	0.0192	0.0193	0.0194	0.0195	0.0196	0.0197	0.0198	0.0199	0.0200	0.0201	0.0202	0.0203	0.0204	0.0205	0.0206	0.0207	0.0208	0.0209	0.0210	0.0211	0.0212	0.0213	0.0214	0.0215	0.0216	0.0217	0.0218	0.0219	0.0220	0.0221	0.0222	0.0223	0.0224	0.0225	0.0226	0.0227	0.0228	0.0229	0.0230	0.0231	0.0232	0.0233	0.0234	0.0235	0.0236	0.0237	0.0238	0.0239	0.0240	0.0241	0.0242	0.0243	0.0244	0.0245	0.0246	0.0247	0.0248	0.0249	0.0250	0.0251	0.0252	0.0253	0.0254	0.0255	0.0256	0.0257	0.0258	0.0259	0.0260	0.0261	0.0262	0.0263	0.0264	0.0265	0.0266	0.0267	0.0268	0.0269	0.0270	0.0271	0.0272	0.0273	0.0274	0.0275	0.0276	0.0277	0.0278	0.0279	0.0280	0.0281	0.0282	0.0283	0.0284	0.0285	0.0286	0.0287	0.0288	0.0289	0.0290	0.0291	0.0292	0.0293	0.0294	0.0295	0.0296	0.0297	0.0298	0.0299	0.0300	0.0301	0.0302	0.0303	0.0304	0.0305	0.0306	0.0307	0.0308	0.0309	0.0310	0.0311	0.0312	0.0313	0.0314	0.0315	0.0316	0.0317	0.0318	0.0319	0.0320	0.0321	0.0322	0.0323	0.0324	0.0325	0.0326	0.0327	0.0328	0.0329	0.0330	0.0331	0.0332	0.0333	0.0334	0.0335	0.0336	0.0337	0.0338	0.0339	0.0340	0.0341	0.0342	0.0343	0.0344	0.0345	0.0346	0.0347	0.0348	0.0349	0.0350	0.0351	0.0352	0.0353	0.0354	0.0355	0.0356	0.0357	0.0358	0.0359	0.0360	0.0361	0.0362	0.0363	0.0364	0.0365	0.0366	0.0367	0.0368	0.0369	0.0370
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100



302

Data ambli	14.70 pica
Data ambli	537.0 R
Data ambli	70.00%
Data scale	1



303

Data amb 14.30 peis	
Data amb 538.0 R	
Data amb 70.00%	
Data scale	1

[illegible]







305

Data ambdi	14.30 psia
Data ambdi	536.0 Ft
Data ambdi	70.00%
Data scale	1















309

Data ambiti 14.30 para  
Data ambiti 536.0 R  
Data ambiti 70.00%  
Data scade !

[illegible]150  
distances: (

roll angle (°)

frequency 55

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130 130

160 0

0 5  
28

250	62.19
320	64.74

400 80.96

500 64.965

630	63.51
800	84.28

1000	63.52
500	64.25

1300 03.34

1600	89.15
2000	78.03

2500	61.00
2500	61.00

3200 63.47

4000	62.81
5000	63.09

5300 62.4

8000 02.16

	10000	70.73
NASPI	80.54	

11



run 109  
 testProg Allison95  
 testRun 5  
 testCase Allison95  
 testCell Allison  
 lead\_sono Kathy Boyd  
 lead\_sono Kathy Boyd  
 lead\_sono Ray Culliner  
 testCell NATR full wedge  
 ngdat JER w/ external supplement  
 mscdat ACQU  
 mscdat BNC  
 mscdat 41,226  
 mscdat 35,102  
 mscdat 78,39  
 scale 4  
 scale 483.52  
 m01 0.30275  
 p01 14.1945  
 p02 562.344  
 p03 78.1  
 p04 0  
 msc 1.17  
 nrc 1.214  
 pc 16.6076  
 p0 17.2321  
 wsc 1.09  
 wsc0 10.011  
 wsc1 11.615  
 wsc2 5.0642  
 p01 17.1708  
 msc 566.289  
 msc0 0.397288  
 msc1 5145.54  
 msc2 18 Nov 96  
 msc3 18 Nov 96  
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 msc96 18 Nov 96  
 msc97 18 Nov 96  
 msc98 18 Nov 96  
 msc99 18 Nov 96  
 msc100 18 Nov 96

Processing date: Fri Aug 22 13:31:47 1997

Data units: 14.70 psia  
 Data units: 50.71 ft/s  
 Data units: 70.00%  
 Data units: 1

distance (ft)	1831.16	1732.05	1865.07	1596.27	1552.91	1523.14	1505.73	1500	1505.73	1500	1505.73	1523.14	1552.91	1596.27	1865.07	1732.05	1831.16	1956.11	2121.32	2233.59	2615.17	3000	3549.3	4385.71	5795.55
year angle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
rot angle (	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
frequency	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
200	42.17	46.33	48.43	48.4	47.56	47.33	47.05	46.82	46.44	46.14	45.86	45.58	45.30	45.02	44.74	44.46	44.18	43.90	43.62	43.34	43.06	42.78	42.50	42.22	
250	40.94	43.86	44.44	43.44	42.86	42.1	41.3	40.5	39.7	38.9	38.1	37.3	36.5	35.7	34.9	34.1	33.3	32.5	31.7	30.9	30.1	29.3	28.5	27.7	
300	39.26	44.89	46.37	46.7	47.41	48.1	48.8	49.5	50.2	50.9	51.6	52.3	53.0	53.7	54.4	55.1	55.8	56.5	57.2	57.9	58.6	59.3	60.0	60.7	
350	40.86	44.52	44.84	44.00	43.05	42.05	41.05	40.05	39.05	38.05	37.05	36.05	35.05	34.05	33.05	32.05	31.05	30.05	29.05	28.05	27.05	26.05	25.05	24.05	
400	39.03	42.85	42.96	42.84	42.56	42.28	42.00	41.72	41.44	41.16	40.88	40.60	40.32	40.04	39.76	39.48	39.20	38.92	38.64	38.36	38.08	37.80	37.52	37.24	
450	37.81	40.86	40.86	41.81	43.37	44.46	45.54	46.62	47.70	48.78	49.86	50.94	52.02	53.10	54.18	55.26	56.34	57.42	58.50	59.58	60.66	61.74	62.82	63.90	
500	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
550	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
600	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
650	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
700	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
750	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
800	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
850	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
900	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
950	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1000	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1050	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1100	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1150	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1200	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1250	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1300	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1350	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1400	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1450	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1500	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1550	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1600	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1650	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1700	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1750	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1800	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1850	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1900	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
1950	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
2000	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
2050	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
2100	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
2150	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
2200	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
2250	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
2300	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
2350	37.44	40.48	40.48	41.43	43.00	44.08	45.16	46.24	47.32	48.40	49.48	50.56	51.64	52.72	53.80	54.88	55.96	57.04	58.12	59.20	60.28	61.36	62.44	63.52	
2400	37.44	40.48																							







312



313

[illegible]



rdg	112
run	1
test_prog	Alison86
test_num	3
test_fac1	LeRC APL
test_fac2	Alison
test_sero	Kathy Boyd
test_sous	Kathy Boyd
test_engir	Ray Castner
mailind	NATL huf wedge
prod	JER w/ external supplement

baseline 17:15:46  
\*\*\*Scenario: Fly-over, full-scale, 1500' altitude, standard day  
Tue Aug 19 16:23:04 1997  
Processing date:

**"Scenario: Fly-over  
Processing date:"**

Delta ambis	14,70 paise
Delta ambis	\$37,0 R
Delta ambis	70,00%
Delta scale	1

distance (	1831.16	1732.05	1655.07	1598.27	1552.81	1523.14	1505.73	1500	1505.73	1523.14	1552.81	1598.27	1655.07	1732.05	1831.16
rad angle (	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
frequency	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
190	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
210	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
220	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
310	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
360	0	0	0	0											



dog	110
un	1
first_prog	Allison96
last_num	3
last_fed	LeRC APL
last_cust	Allison
lead_aero	Kathy Boyd
lead_sco	Kathy Boyd
lead_engr	Ray Castner
airbird	NATR full wedge
febird	NEER w/ external supplement

Variable	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis	Shapiro-Wilk	Normality test
Age	41.226	35.02	18	97	0.077	3.023	0.999	0.999
Gender	78.30	4	76	80	0.077	3.023	0.999	0.999
Marital status	14.185	14.185	0	28	0.077	3.023	0.999	0.999
Education	501.355	75.01	400	600	0.077	3.023	0.999	0.999
Income	17.41	1.822	15	20	0.077	3.023	0.999	0.999
Health	24.7135	25.8533	0	49	0.077	3.023	0.999	0.999
Work	2.439	1.413	0	5	0.077	3.023	0.999	0.999
Religion	506.137	65.555	400	600	0.077	3.023	0.999	0.999
Political	601.701	60.1701	500	700	0.077	3.023	0.999	0.999
Marriage	0.751048	0.751048	0	1	0.077	3.023	0.999	0.999
Gender	1976.1	1976.1	0	3952	0.077	3.023	0.999	0.999
Age	103.1226	103.1226	0	206	0.077	3.023	0.999	0.999
Gender	97	97	0	194	0.077	3.023	0.999	0.999
Age	16 Nov 96	16 Nov 96	0	194	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	97.0619	97.0619	0	194	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Gender	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999
Age	1720.03	1720.03	0	3440	0.077	3.023	0.999	0.999

Data ambiti 14.30 p.m.

Data number 5368.0 A

Data amplitude	70.00%
Data scale	1

1000

distance: (°)	150
wave number	55

roll angle (°)	yaw angle (°)	D
0	0	0.000
0	15	0.000
0	30	0.000
0	45	0.000
0	60	0.000
0	75	0.000
0	90	0.000
0	105	0.000
0	120	0.000
0	135	0.000
0	150	0.000
0	165	0.000
0	180	0.000
0	195	0.000
0	210	0.000
0	225	0.000
0	240	0.000
0	255	0.000
0	270	0.000
0	285	0.000
0	300	0.000
0	315	0.000
0	330	0.000
0	345	0.000
0	360	0.000
15	0	0.000
15	15	0.000
15	30	0.000
15	45	0.000
15	60	0.000
15	75	0.000
15	90	0.000
15	105	0.000
15	120	0.000
15	135	0.000
15	150	0.000
15	165	0.000
15	180	0.000
15	195	0.000
15	210	0.000
15	225	0.000
15	240	0.000
15	255	0.000
15	270	0.000
15	285	0.000
15	300	0.000
15	315	0.000
15	330	0.000
15	345	0.000
15	360	0.000
30	0	0.000
30	15	0.000
30	30	0.000
30	45	0.000
30	60	0.000
30	75	0.000
30	90	0.000
30	105	0.000
30	120	0.000
30	135	0.000
30	150	0.000
30	165	0.000
30	180	0.000
30	195	0.000
30	210	0.000
30	225	0.000
30	240	0.000
30	255	0.000
30	270	0.000
30	285	0.000
30	300	0.000
30	315	0.000
30	330	0.000
30	345	0.000
30	360	0.000
45	0	0.000
45	15	0.000
45	30	0.000
45	45	0.000
45	60	0.000
45	75	0.000
45	90	0.000
45	105	0.000
45	120	0.000
45	135	0.000
45	150	0.000
45	165	0.000
45	180	0.000
45	195	0.000
45	210	0.000
45	225	0.000
45	240	0.000
45	255	0.000
45	270	0.000
45	285	0.000
45	300	0.000
45	315	0.000
45	330	0.000
45	345	0.000
45	360	0.000
60	0	0.000
60	15	0.000
60	30	0.000
60	45	0.000
60	60	0.000
60	75	0.000
60	90	0.000
60	105	0.000
60	120	0.000
60	135	0.000
60	150	0.000
60	165	0.000
60	180	0.000
60	195	0.000
60	210	0.000
60	225	0.000
60	240	0.000
60	255</	

frequency	80
55	34.02

50	74.02
100	74.84

130	74.56
131	75.04

160	76.06
200	77.54

250 78.94

320	79.4
400	80.63

500 01.00

630	51.82
500	53.9

800	83.9
1000	84.84

1300	86.87
1400	87.85

1990	87.85
2000	88.7

2500	88.39
3000	88.41

3200 88.41  
4000 88.36

5000 87.07

8,500	8,474
8,500	8,474

150000 82.07

QASPL 98.12



Mon Aug 18 16:59:18 1997

1000

[illegible]



## **100%L, 20UH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L







[Flyover data point A for 100%L, 20UH (file T443.xls) not processed]



320

Data amb: 14.30 pda  
Data amb: 536.0 R  
Data amb: 70.00%  
Data scale: 1



dog	442
run	1
test_prog	Allison98
test_num	3
test_facr	LeRC APL
test_cust	Allison
read_aero	Kathy Boyd
read_acou	Kathy Boyd
read_angle	Ray Cashner
rainbd	NATR Int wedge

biohime 21:26:03  
 \*\*Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Mon Aug 18 09:39:38 1997  
 Print/saving date:

Data ambient	14.70 psia
Data ambient	537.0 R
Data ambient	70.00%
Data scale	1

distance (	1831.16	1732.05	1594.27	1552.91	1523.14	1505.73	1500	1505.73	1523.14	1552.91	1594.27	1835.07	1732.05	1831.16	1594.11	2121.92	2303.59	2615.17	3000	3549.74	4396.71	5796.55
year angle (	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
frequency	95	80	65	50	35	20	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1831.16	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1732.05	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1594.27	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1552.91	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1523.14	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1505.73	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1500	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1505.73	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1523.14	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1594.27	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1552.91	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1523.14	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1505.73	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1500	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1505.73	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1523.14	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1594.27	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1552.91	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
1523.14	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145			







prdg	441
run	1
test_prog	Almon96
test_num	3
test_tech	LeRC APL
test_cust	Alison
lead_aero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engr	Ray Cashner
natbird	NATR full wedge
ngbird	JER w/ external supplement

Scenario: Fly-over, full-scale, 15007 sideline, standard day  
Processing date: Mon Aug 18 09:42:13 1997  
bchime 21:18:49

Data ambis	14.70 pais
Data ambis	537.0 A
Data ambis	70.00%
Data ambis	1

[illegible]



[illegible]

Data ambida	14.30 pesos
Data ambida	538.0 R
Data ambida	70.00%

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524
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325



Top	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
top	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
top	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
top	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
top	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
top	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
top	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488												

Full scale; Third-octave SPL  
Wed Aug 20 05:12:38 1997

Data ambisi	14.30 milia
Data ambisi	538.0 R
Data ambisi	70.00%
Data ambisi	1

[illegible]

OAS







nutrient	NATH full wedge	JER w/ external supplement
nitrogen	1.00	1.00
phosphorus	0.10	0.10
potassium	0.10	0.10
calcium	0.10	0.10
magnesium	0.10	0.10
sulfur	0.10	0.10
iron	0.10	0.10
copper	0.10	0.10
zinc	0.10	0.10
boron	0.10	0.10
manganese	0.10	0.10
nickel	0.10	0.10
vanadium	0.10	0.10
silicon	0.10	0.10
fluorine	0.10	0.10
iodine	0.10	0.10
chromium	0.10	0.10
cobalt	0.10	0.10
barium	0.10	0.10
strontium	0.10	0.10
lithium	0.10	0.10
rubidium	0.10	0.10
cesium	0.10	0.10
beryllium	0.10	0.10
aluminum	0.10	0.10
gallium	0.10	0.10
indium	0.10	0.10
thallium	0.10	0.10
lead	0.10	0.10
tin	0.10	0.10
antimony	0.10	0.10
arsenic	0.10	0.10
phosphorus	0.10	0.10
sulfur	0.10	0.10
chlorine	0.10	0.10
fluorine	0.10	0.10
iodine	0.10	0.10
boron	0.10	0.10
calcium	0.10	0.10
phosphorus	0.10	0.10
potassium	0.10	0.10
magnesium	0.10	0.10
iron	0.10	0.10
copper	0.10	0.10
zinc	0.10	0.10
nickel	0.10	0.10
vanadium	0.10	0.10
silicon	0.10	0.10
fluorine	0.10	0.10
iodine	0.10	0.10
chromium	0.10	0.10
cobalt	0.10	0.10
barium	0.10	0.10
strontium	0.10	0.10
lithium	0.10	0.10
rubidium	0.10	0.10
cesium	0.10	0.10
beryllium	0.10	0.10
aluminum	0.10	0.10
gallium	0.10	0.10
indium	0.10	0.10
thallium	0.10	0.10
lead	0.10	0.10
tin	0.10	0.10
antimony	0.10	0.10
arsenic	0.10	0.10
phosphorus	0.10	0.10
sulfur	0.10	0.10
chlorine	0.10	0.10
fluorine	0.10	0.10
iodine	0.10	0.10
boron	0.10	0.10
calcium	0.10	0.10
phosphorus	0.10	0.10
potassium	0.10	0.10
magnesium	0.10	0.10
iron	0.10	0.10
copper	0.10	0.10
zinc	0.10	0.10
nickel	0.10	0.10
vanadium	0.10	0.10
silicon	0.10	0.10
fluorine	0.10	0.10
iodine	0.10	0.10
chromium	0.10	0.10
cobalt	0.10	0.10
barium	0.10	0.10
strontium	0.10	0.10
lithium	0.10	0.10
rubidium	0.10	0.10
cesium	0.10	0.10
beryllium	0.10	0.10
aluminum	0.10	0.10
gallium	0.10	0.10
indium	0.10	0.10
thallium	0.10	0.10
lead	0.10	0.10
tin	0.10	0.10
antimony	0.10	0.10
arsenic	0.10	0.10
phosphorus	0.10	0.10
sulfur	0.10	0.10
chlorine	0.10	0.10
fluorine	0.10	0.10
iodine	0.10	0.10
boron	0.10	0.10
calcium	0.10	0.10
phosphorus	0.10	0.10
potassium	0.10	0.10
magnesium	0.10	0.10
iron	0.10	0.10
copper	0.10	0.10
zinc	0.10	0.10
nickel	0.10	0.10
vanadium	0.10	0.10
silicon		

NO20  
BASE

41.226	41.226
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amuzc	35.02
ambab	78.39

Scale 4  
A1827

0.19952

perno	14.4437
lamba	495.272

returned	80.98
unknown	0

1.388  
npirc

nrpb 1.439  
plc 20.0479

20,7845  
2 784

13.487

HC	1174.14
MD	500.690

plénièr	20.05.84
Sénièr	615.928

minipnd	0.873315
minipnd	0.873315

grain	1,330,5
bedchamber	(26)

bkgrnd 430  
enddate 04.Dec.98

esclina 20:57:15

UAD-Score 97.06.16  
DAD-Score 20:57:15

buchdate 04.Dec.98  
buchtime 20:57:15

Scenario: 150 foot arc; 77F, 70%; Full Moon

**Processing Unit.**

Data sample 14.30 pairs  
Data sample 5.95.0 R

Delta ambili	70.00%
Delta esda	

**0829 THU**

distance: (f)	150	150
view angle	35	60

roll angle (°)	0	0	20
roll angle (°)	0	0	20

Frequency	50	55
67.01	67.95	68.00

100	69.51	70.27
130	69.73	69.88

180	59.79	70.71
200	70.00	71.54

200	70.00	71.50
250	73.0	72.50

320	73.2	74.04
400	72.7	74.07

500	73.52	75.19
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530	74.24	78.17
800	74.96	78.92

1000	70.58	78.77
1300	77.06	79.39

1500	78.17	79.63
1600	78.17	79.63

2000	77.48	78.9
2500	75.6	76.94

3200	73.3	74.39
4000	71.83	72.86

4000	70.27	71.79
5000		70.65
4000		70.65

6300	69.03	70.63
8000	68.48	70.27

10000	67.06	67.62
OASPL	67.17	68.58

328



avg	437
run	1
test_prog	Allison98
test_num	3
test_fac1	LoRC APL
test_cust	Allison
lead_aero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engr	Ray Casner
matrid	NATR full wedge
hobid	JER w/ external supplement

Data ambra	14.70 paia
Data ambra	537.0 R
Data ambra	70.00%
Data scale	?

Distance (°)	1831.16	1732.05	1855.07	1508.27	1552.91	1523.14	1505.73	1500	1505.73	1523.14	1532.81	1536.27	1855.07	1732.05	1831.16	1508.11	2121.32	2333.59	2815.17	3000	3549	4385.71	5795.55
Yaw angle	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
Frequency	180	49.65	48.36	46.95	45.48	43.96	42.40	40.82	39.22	37.60	35.96	34.30	32.63	30.95	29.26	27.56	25.84	24.11	22.37	20.62	18.86	17.08	
180	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
190	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
200	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
210	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
220	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
230	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
240	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
250	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
260	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
270	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
280	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
290	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
300	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
310	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97	32.46	30.94	29.41	27.87	26.32	24.76	23.19	21.61	20.02	18.43	16.85	
320	48.56	47.11	45.68	44.26	42.82	41.37	39.91	38.44	36.96	35.47	33.97</												







[illegible]



run 439  
 test\_prog Allcon06  
 test\_num 3  
 test\_jact Left APL  
 test\_cord Allison  
 test\_memo Kathy Boyd  
 test\_about Kathy Boyd  
 test\_engine C-7  
 test\_jet NATR lot wedge  
 test\_jet JET w/ external supplement  
 modid MOD0  
 modbid BASE  
 anoz 41.228  
 smisc 35.02  
 armdb 78.39  
 scale 4  
 vid 991.86  
 m01 0.19449  
 p01 1.44222  
 p02 408.485  
 p03 60.85  
 w01 0  
 w02 1.706  
 w03 1.822  
 w04 25.0734  
 w05 28.3155  
 w06 3.401  
 w07 18.292  
 w08 1400.8  
 w09 267.728  
 w10 84.485  
 w11 0.797505  
 w12 21516.4  
 w13 430  
 w14 04 Dec 06  
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 w99 21 Oct 20  
 w100 21 Oct 20

Processing date: Mon Aug 18 09:36:51 1997

Data amb 14.30 psia  
 Data amb 538.0 R  
 Data amb 70.00%

Data scale 1

Distance (

view angle (

not angle (

frequency

130 78.5

150 77.15

175 76.41

200 76.11

225 76.11

250 76.11

275 76.11

300 76.11

325 76.11

350 76.11

375 76.11

400 76.11

425 76.11

450 76.11

475 76.11

500 76.11

525 76.11

550 76.11

575 76.11

600 76.11

625 76.11

650 76.11

675 76.11

700 76.11

725 76.11

750 76.11

775 76.11

800 76.11











[illegible]







[illegible]



[illegible]

Data ending 14.30 pm

Data: 2008.04.08  
 Data: 2008.05.08

Date	Amount	Total
7-1-00	70.00%	

Data scale

distance: (1) 150

55 yaw angle

roll angle (°)	0	25
----------------	---	----

frequency	53
	71.92
80	

100 72.01

130	72 83
180	72 27

160	73.27
200	73.78

200	73.16
250	74.59

320 76.44

400	76.59
500	77.12

500 77.54  
630 77.79

300 79 87

1000	82.81
1200	84.08

1300	84.88
1600	84.84

2000 05 58

2500	84.31
9200	81.51

3200	01.51
4000	79.17

5000	76.04
------	-------

6300	75.3
8000	73.82

100000	72.11
80000	73.58

04SP1 93.02



[illegible]



[illegible]

Date: 11/30/2011

Order number 538 018  
 Order number 14.30 psc

Data sample	70.000%
-------------	---------

Page	Date	Time	Location	Observer	Species	Count	Notes
1	10/10/01	10:00	1000m	1000m	1000m	1000m	1000m

1-800-854-8140

distance: (150

yaw angle 55

roll angle ( $\phi$ )

Frequency

80	75.04
100	70.77

100 79.17  
130 75.54

130	75.54
160	76.19

100 77.38

250 78.11

320 70.43

400	80.12
-----	-------

500 02.21

630 82.10 94.8

51.5 000

1000	60.82
1300	87.82

1300 19.8

1600	90.65
2000	90.65

2500 90.06

3200 69.93

4000	89.29
------	-------

5000 0015

07 25  
6300

10.31	5000
10.32	5000

100001	000001
045810	000001
000001	000001

ITEM 74500

340







## **100% L, 20MH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L



prog	337
run	1
test_prog	Alison98
test_num	3
test_fac1	LeRC AP1
test_cust	Allison
test_name	Kathy Boyd
test_email	Kathy Boyd
test_engr	Ray Castner
test_attr1	NATR nut wedge
test_attr2	JERI w/ external supplement

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Data ambic 14.30 psila  
Data ambic 536.0 R  
Data ambic 70.00%  
Data scale 1

[illegible]







tdg	338
run	1
test_prog	Alison98
test_num	3
test_fld1	LeRC APL
test_cust	Alison
read_aero	Kathy Boyd
read_acou	Kathy Boyd
read_engin	Ray Castner
nameid	NATR full wedge
notid	JER full/wedge supplement

[illegible]

ata ambu 14.30 psia  
ata ambu 5.98 Q B

etla ambia	70.00%
etla ambia	1

Distance: (1) 150

Angle	Angle
55	0

frequency	55
80	72.93

100	74.51
130	74.52

180	76.01
200	77.17

250	77.13
320	77.76
400	77.85

400	77.55
500	77.42
630	77.4

850	77.65
900	77.63

1300	77.74
1600	77.81

2000	77.07
2500	75.81

3200	74.39
4000	73.24

5000	71.86
6300	70.45

3000	59.35
10000	66.29

745V0  
00935

%; Full scale; Third-octave SPL  
Mon Aug 18 10:27:58 1997

150	05
70	05

0 65 70 0

74.04	74.02
70.83	77.68
77.72	70.05

75.12	76.00	77
76.99	77.48	
78.75	79.82	

70.32	70.17	70.73
70.94	70.27	

78.33	79.04
78.75	79.32

70.11	70.6
72.94	80.39

60.12	60.57
60.25	60.63

80.04	80.19
79.1	79.32

77.53	77.91
78.04	78.48

74.83	75.35
73.67	73.64
72.52	72.78

72.53	72.73
71.6	71.84
69.78	69.51

91.07 91.5

0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575</																																																																																					

[illegible]

100



346

Data ambig	14.70 peds
Data ambig	537.0 A
Data ambig	70.00%
Data score	1



prog	339
run	1
test_prog	Alison96
test_num	3
test_facil	LePC APL
test_cust	Alison
test_sero	Kathy Boyd
test_acou	Kathy Boyd
test_engir	Ray Cestner
matrid	NATR full wedge
trid	JER w/external supplement

[illegible]

QASPL







rdg	341
run	1
test_prog	Alison98
test_num	3
test_facil	LoRC APL
test_cust	Alison
test_aero	Kathy Boyd
test_acou	Kathy Boyd
test_engin	Ray Castner
test_lul	NATR lul wedge
test_suppl	JER w/ external supplement

blatime 18:01:32  
 \*\*Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Processing date: Mon Aug 18 10:33:28 1997

Data sample 14.30 pairs	
Data sample 536.0 A	
Data sample 70.00%	
Data scale	1

[illegible]



rig 341  
 test prog Allison6  
 test num 3  
 test facs LERC APL  
 test cust Allison  
 test\_aero Kathy Boyd  
 test\_accu Kathy Boyd  
 test\_engr Ray Casner  
 nairid NATI full wedge  
 rigid test for external supplement  
 model 1430  
 model BASE  
 anoz 41.228  
 anozc 35.02  
 anozb 78.39  
 scale 4  
 vid 989.12  
 mdt1 0.0027  
 pamb 14.3445  
 umb 489.235  
 humed 89.65  
 humed1 0  
 rpb 1.743  
 rpb 1.824  
 ptc 25.0025  
 ptc 26.1644  
 ptc 3.32  
 weidb 18.327  
 itc 1389.77  
 itc 501.172  
 ptttr 25.5882  
 anozc 638.896  
 anozb 0.798187  
 ptttr 21411.5  
 baechan (26)  
 bugrd 331  
 enccelle 02 Dec 86  
 enccelle 18.0132  
 DAOSdate 97.08.18  
 DAOStime 1801132  
 DAOSdate 06 Dec 86  
 DAOStime 180132  
 DAOSdate 06 Dec 86

Scenario: Fly-over, full-scale, 15007 altitude, standard day  
 Propagating date: Mon Aug 18 10:33:36 1997

Data amb=14.70 pas  
 Data amb=537.0 R  
 Data amb= 70.00%  
 Data scale 1

distance: (	1831.16	1732.05	1655.07	1590.27	1552.81	1523.14	1506.73	1500	1506.73	1523.14	1552.81	1590.27	1655.07	1732.05	1831.16	1858.11	2121.32	2333.59	2615.17	3000	3549.3	4385.71	5795.55	165
year angle (	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
freq (Hz)	80	59.03	80.83	82.23	83.63	85.03	86.43	87.83	89.23	90.63	92.03	93.43	94.83	96.23	97.63	99.03	100.43	101.83	103.23	104.63	106.03	107.43	108.83	110.23
100	60.71	62.22	64.09	64.89	65.42	65.77	66.06	66.31	66.52	66.71	66.88	67.03	67.17	67.29	67.39	67.48	67.56	67.63	67.69	67.74	67.78	67.81	67.83	67.85
130	82.98	84.09	84.89	85.42	85.77	86.06	86.31	86.52	86.71	86.88	87.03	87.17	87.29	87.39	87.48	87.56	87.63	87.69	87.74	87.78	87.81	87.83	87.85	87.87
180	64.06	65.86	66.18	66.21	66.36	66.51	66.66	66.81	66.96	67.11	67.26	67.41	67.56	67.71	67.86	68.01	68.16	68.31	68.46	68.61	68.76	68.91	69.06	69.21
200	64.27	65.32	66.1	66.7	67.19	67.64	68.09	68.54	68.99	69.44	69.89	70.34	70.79	71.24	71.69	72.14	72.59	73.04	73.49	73.94	74.39	74.84	75.29	75.74
250	63.86	64.78	65.47	65.97	66.37	66.71	67.01	67.26	67.51	67.76	68.01	68.26	68.51	68.76	69.01	69.26	69.51	69.76	70.01	70.26	70.51	70.76	71.01	71.26
320	63.83	64.83	65.27	65.64	65.96	66.24	66.51	66.78	67.05	67.32	67.59	67.86	68.13	68.4	68.67	68.94	69.21	69.48	69.75	70.02	70.29	70.56	70.83	71.1
400	62.55	63.25	64.08	64.68	65.29	65.85	66.36	66.81	67.26	67.71	68.16	68.61	69.06	69.51	69.96	70.41	70.86	71.31	71.76	72.21	72.66	73.11	73.56	74.01
500	62.54	63.71	64.44	64.94	65.45	65.91	66.37	66.83	67.29	67.75	68.21	68.67	69.13	69.59	70.05	70.51	70.97	71.43	71.89	72.35	72.81	73.27	73.73	74.19
600	62.52	63.7	64.42	64.93	65.45	65.92	66.39	66.86	67.33	67.79	68.26	68.73	69.2	69.67	70.14	70.61	71.08	71.55	72.02	72.49	72.96	73.43	73.9	74.37
1000	62.18	63.87	64.64	65.04	65.46	65.86	66.23	66.6	66.97	67.34	67.71	68.08	68.45	68.82	69.19	69.56	69.93	70.3	70.67	71.04	71.41	71.78	72.15	72.52
1300	61.57	63.19	64.15	64.72	65.2	65.7	66.24	66.7	67.18	67.65	68.12	68.59	69.06	69.53	69.99	70.46	70.93	71.4	71.87	72.34	72.81	73.28	73.75	74.22
1600	61.37	63.22	64.16	64.83	65.26	65.72	66.24	66.71	67.18	67.65	68.12	68.59	69.06	69.53	69.99	70.46	70.93	71.4	71.87	72.34	72.81	73.28	73.75	74.22
2000	60.89	62.9	63.94	64.46	64.81	65.12	65.44	65.76	66.08	66.4	66.71	67.03	67.34	67.65	67.96	68.27	68.58	68.89	69.2	69.51	69.82	70.13	70.44	70.75
2500	59.37	61.15	62.31	63.29	63.81	64.27	64.78	65.23	65.68	66.13	66.58	67.03	67.48	67.93	68.38	68.83	69.28	69.73	70.18	70.63	71.08	71.53	71.98	72.43
3200	57.35	59.37	60.91	61.93	62.11	62.3	62.5	62.7	62.9	63.1	63.3	63.5	63.7	63.9	64.1	64.3	64.5	64.7	64.9	65.1	65.3	65.5	65.7	65.9
4000	53.85	56.27	57.73	58.75	59.15	59.48	59.81	60.14	60.47	60.8	61.13	61.46	61.79	62.12	62.45	62.78	63.11	63.44	63.77	64.1	64.43	64.76	65.09	65.42
5000	49.96	51.7	52.73	53.48	53.82	54.15	54.48	54.81	55.14	55.47	55.8	56.13	56.46	56.79	57.12	57.45	57.78	58.11	58.44	58.77	59.1	59.43	59.76	60.09
6000	46.96	48.17	48.96	49.49	49.82	50.15	50.48	50.81	51.14	51.47	51.8	52.13	52.46	52.79	53.12	53.45	53.78	54.11	54.44	54.77	55.1	55.43	55.76	56.09
8000	39.52	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53
10000	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52	29.52
CASPR	74.69	75.95	76.77	77.4	77.82	78.45	78.99	79.42	79.84	80.26	80.68	81.1	81.51	81.91	82.31	82.71	83.11	83.51	83.91	84.31	84.71	85.11	85.51	85.91
PNL	83.49	85.16	86.24	87.08	87.61	88.15	88.75	89.36	89.96	90.56	91.16	91.76	92.36	92.96	93.56	94.16	94.76	95.36	95.96	96.56	97.16	97.76	98.36	98.96







dg	345
un	1
east_prog	Atkinson
east_num	3
east_lazl	LEPC APL
east_cust	Atkinson
east_aero	Kathy Boyd
east_acou	Kathy Boyd
east_engr	Ray Cassner
unairbid	NATHAL wedge
unbid	JER w/ external supplement

bchtime 18:44:00  
 ---Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Wed Aug 20 03:07:23 1997

Data ambu	14.70 psia
Data ambu	537.0 ft
Data ambu	70.00%
Data scale	1

[illegible]







un	10	344	
test_prog	Allison06	1	
test_num		3	
test_facil	LARC APL		
test_cust	Allison		
read_sero	Kathy Boyd		
read_acou	Kathy Boyd		
read_engr	Ray Castner		
readbld	NATW full wedge		
readbld	JERW full external supplement		

Data amb: 14.70 pela
Data amb: 537.0 R
Data amb: 70.00%
Data scale: 1

[illegible]



355

Data ambig 14.30 psia  
Data ambig 536.0 ft  
Data ambig 70.00%  
Data scale 1















[illegible]

**Date Rec'd**

Dele symboli 14.50/pack  
Dele symboli 538.0 R

Deal # 31124	300.00%
Deal # 31125	70.00%

Data scale 1

distance: 6150

55

0 0

Frequency	$\mu$
55	0

100

130 0

180 0

200 0

250	85.57
-----	-------

320	85.90
-----	-------

400 60,82

500 65

030 65.44

030 65.44

800	05.54
1,000	05.31

1000	63.21
1500	63.79

1300	83.78
1600	81.44

1000	56.74
2000	56.74

2300 59.07

3200 59.43

4000 50.87

5000	58.95
5000	58.95

5300	60.64
5300	61.78

81.89  
87.28

10000  
67.50  
75.37  
DASPL

2000



dog	348	
run	1	
test_prog	Atkinson	96
test_num		3
test_facil	LePRC	APL
test_cust	Alison	
test_sero	Kathy	Boyd
test_secu	Kathy	Boyd
test_engr	Ray	Castner
test_natr	NATR	nut wedge
test_jer	JER	nut external supplement

bedtime 18:52:44  
 --Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Succession date: Wed Aug 20 03:10:18 1997

Data ambig	14.70 pela
Data ambig	537.0 A
Data ambig	70.00%
Data scale	1

[illegible]



run 347  
 test\_prog Allison96  
 test\_num 3  
 test\_loc LARC APL  
 test\_cst Allison  
 test\_sero Barry Boyd  
 test\_cstn Barry Boyd  
 test\_engr Rtr Cassler  
 nrmdb NATR full wedge  
 ngnd JER w/ external supplement  
 mubdb MD20  
 nozdbd BASE  
 anoz 41.226  
 smisc 35.02  
 smdb 78.39  
 scale 4  
 wd 811.8  
 pntd 0.29989  
 pntd 14.2582  
 lrrb 486.685  
 rhumb 72.26  
 winda1 0  
 rprc 1.39  
 rprb 1.446  
 plc 19.8189  
 pib 20.6174  
 wscd 2.562  
 wscd 113.95  
 wscd 504.487  
 rrc 20.4892  
 rrra 613.325  
 mspnd 0.689463  
 drvwsp 12951.8  
 bcdchan [28]  
 bgrnd 333  
 excdate 02 Dec 96  
 excrme 18:59:50  
 DAUSdate 02 Dec 96  
 DAUSrme 18:59:50  
 bcdchan 02 Dec 96  
 bcdchan 18:59:50

--Sensor: 150 foot arc; 77F, 70%; Full scale: Third-octave SPL  
 Processing date: Mon Aug 18 10:36:17 1997

Delta amb 14.30 psia  
 Delta amb 538.0 ft  
 Delta amb 70.00%

Delta scale

Distance: (

year angle (

not angle (

frequency

100

130

160

200

250

300

400

500

630

800

1000

1250

1500

1800

2000

2500

3200

4000

5000

6300

8000

10000

OutSPL

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

320

330

340

350

360

370

380

390

400

410

420

430

440

450

460

470

480

490

500



prog	347
run	1
test_prog	Alison96
test_num	3
test_facil	LeRC APL
test_cust	Alison
lead_aero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engr	Ray Ceaner
material	NATR full wedge
comment	JER w/ external supplement

bchtime 10:59:50  
 \*\*Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Wed Aug 27 10:31:02 1987

Data ambis 14.70 pais  
 Data ambis 537.0 A  
 Data ambis 70.00%  
 Data scale 1

[illegible]







rdg	346
run	1
test_prog	Alison96
test_num	3
test_facil	LEPC APL
test_cust	Alison
test_aero	Kathy Boyd
test_acou	Kathy Boyd
test_engr	Ray Castner
test_fur	NATR fur wedge
test_jer	JER w/ external supplement
inbid	

b1chtime 19:08:25  
 --Scenario: Fly-over, full-scale, 1500' sidebars, standard day  
 Processing date: Wed Aug 27 10:39:34 1997

Data ambis	14,70 pada
Data ambis	5,37,0 R
Data ambis	70,00%
Data score	!

[illegible]











## **100%L, 20DH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L











log	234
west_prog	Allison98
west_num	3
west_facd	LARC APL
west_out	Allison
lead_aero	Kathy Boyd
lead_aoco	Kathy Boyd
lead_appl	John Allison
lead_natr	NATRI via wedge
noded	JER w external supplement
DP20	
mhd36d	
ncut36d	BASE
anc2	41.226
amtc	35.02
ambto	78.39
a	4
scales	815.23
mo1	0.01663
pemb	14.4652
tumb	498.184
rhumid	59.36
wspcst1	0
npcc	1.383
npdb	1.437
fpc	20.1122
psfcs	20.2576
vscjs	2.563
vecdB	13.743
lc	1176.24
lb	502.967
penal	20.6578
tenis	806.54
mbapnd	0.874046
prvsnr	1.82663
sdcthon	{25}
bapnd	227
eacdhle	22 Nov 98
excline	15 40 19
DADScale	87 08 18
DADScene	15 40 19
brichole	22 Nov 98
brichole	15 40 19
... ..	150 foot arc: 77F, 70% Full scale, Third-order SPL
Processing date:	Mon Aug 18 09:14:31 1997

[illegible]



[illegible]







biotime 16:07:44  
 \*\*\*Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Mon Aug 18 09:17:17 1997

Data ambis	14.70 posia
Data ambis	537.0 R
Data ambis	70.00%
Data scale	1

[illegible]







prog	236
run	1
test_prog	Alison86
test_num	3
test_fac1	LeRC AP1
test_cust	Alison
lead_sero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engin	Ruby Custer
matbld	NATR full wedge
ref	ICR full thermal supplement

lead_engin	Huy	Cashier
natbold	NATB	full wedge
natbold	NATB	external supplement

DP20	BASE
DP20	BASE

8002	41.228
8110C	35.02

Unit	78.30
Scale	4
...	...

year	2005-06
m01	0.01138
month	14.4577

lamb	497.954	
rhinoid	50.9	

winds?	0
none	1,744

npio	1.82
pic	25.2142
	26.217

pa0	26.519
wa0c0	3.069
wa0c10	18.558

MC	1418.14
MD	508.126

ptmiz	26.1572
trmiz	835.203

mlapnd	0.78141
grvslap	20091.8
hachoban	1253

background	1207	227
bgnd		
esdate	22-Nov-88	

exitTime 16.23.25  
DADSdate 97.08.10

DADStime 16.23:25  
 bchdate 22 Nov.96  
 4.0.00.00

Scenario: Fly-over, full-scale, 1500 sq  
Processing date: Mon A

Processing time:  
Data sample 14 70 pairs

Data ambu	537.0 R
Data embis	70.00%

Data scale	$r$	$r^2$	$r^2$ for 100
1	0.99	0.98	98
2	0.98	0.96	96
3	0.97	0.94	94
4	0.96	0.92	92
5	0.95	0.90	90
6	0.94	0.88	88
7	0.93	0.86	86
8	0.92	0.84	84
9	0.91	0.82	82
10	0.90	0.81	81
11	0.89	0.79	79
12	0.88	0.77	77
13	0.87	0.76	76
14	0.86	0.74	74
15	0.85	0.72	72
16	0.84	0.70	70
17	0.83	0.69	69
18	0.82	0.67	67
19	0.81	0.66	66
20	0.80	0.64	64
21	0.79	0.63	63
22	0.78	0.61	61
23	0.77	0.60	60
24	0.76	0.58	58
25	0.75	0.56	56
26	0.74	0.55	55
27	0.73	0.53	53
28	0.72	0.52	52
29	0.71	0.50	50
30	0.70	0.49	49
31	0.69	0.47	47
32	0.68	0.46	46
33	0.67	0.45	45
34	0.66	0.43	43
35	0.65	0.42	42
36	0.64	0.41	41
37	0.63	0.40	40
38	0.62	0.38	38
39	0.61	0.37	37
40	0.60	0.36	36
41	0.59	0.35	35
42	0.58	0.34	34
43	0.57	0.32	32
44	0.56	0.31	31
45	0.55	0.30	30
46	0.54	0.29	29
47	0.53	0.28	28
48	0.52	0.27	27
49	0.51	0.26	26
50	0.50	0.25	25
51	0.49	0.24	24
52	0.48	0.23	23
53	0.47	0.22	22
54	0.46	0.21	21
55	0.45	0.20	20
56	0.44	0.19	19
57	0.43	0.18	18
58	0.42	0.17	17
59	0.41	0.17	17
60	0.40	0.16	16
61	0.39	0.15	15
62	0.38	0.14	14
63	0.37	0.14	14
64	0.36	0.13	13
65	0.35	0.12	12
66	0.34	0.12	12
67	0.33	0.11	11
68	0.32	0.10	10
69	0.31	0.10	10
70	0.30	0.09	9
71	0.29	0.09	9
72	0.28	0.08	8
73	0.27	0.07	7
74	0.26	0.07	7
75	0.25	0.06	6
76	0.24	0.06	6
77	0.23	0.05	5
78	0.22	0.05	5
79	0.21	0.04	4
80	0.20	0.04	4
81	0.19	0.04	4
82	0.18	0.03	3
83	0.17	0.03	3
84	0.16	0.03	3
85	0.15	0.02	2
86	0.14	0.02	2
87	0.13	0.02	2
88	0.12	0.01	1
89	0.11	0.01	1
90	0.10	0.01	1
91	0.09	0.00	0
92	0.08	0.00	0
93	0.07	0.00	0
94	0.06	0.00	0
95	0.05</		

distance (°)	183.16	1732.05	160
yaw angle	55	60	0
roll angle (°)	0	0	0

ion signal (cps)	frequency	80
55	80	
58.73	58.83	
60	60	

100	81.89	83.17	8
130	82.89	84.2	8

180	64.23	65.1
200	64	64.62

320	64.28	64.8
320	62.86	63.79
400	61.62	62.81

400	61.82	63.01
500	62.37	63.09
630	62.1	63.16

800	61.79	62.93
1000	61.99	63.26

1300	61.33	62.53
1600	60.62	62.2

2000	59.85	61.3
2500	50.3	59.67
3000	66.28	59.01

3200	53.26	55.27	50.61
4000	53.05	55.27	50.61
5000	49.15	50.74	50.61

6300	39.7	43.08
6000	28.04	32.19

10000	0	0.66
QASPL	74.29	75.35

PWL 82.74 84.13

Altitude	1831.16	1722.05	1652.07	1598.27	1532.14	1522.14	1506.73	1500	1506.73	1523.14	1532.14	1552.81	1598.27	1652.07	1722.05	1831.16	1958.11	2121.22	2333.58	2615.17	3000	3549.71	4385.71	5795.55
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	150	155	160	165
57	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
58	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
59	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
60	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
61	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
62	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
63	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
64	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
65	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
66	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
67	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
68	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25	82.50	83.75	85.00	86.25	87.50
69	58.83	60.02	61.26	62.51	63.75	65.00	66.25	67.50	68.75	70.00	71.25	72.50	73.75	75.00	76.25	77.50	78.75	80.00	81.25					











[illegible]

Data sample 14.30 psia
Data sample 536.0 R
Data sample 70.00%

Data scale		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		25		26		27		28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52		53		54		55		56		57		58		59		60		61		62		63		64		65		66		67		68		69		70		71		72		73		74		75		76		77		78		79		80		81		82		83		84		85		86		87		88		89		90		91		92		93		94		95		96		97		98		99		100		101		102		103		104		105		106		107		108		109		110		111		112		113		114		115		116		117		118		119		120		121		122		123		124		125		126		127		128		129		130		131		132		133		134		135		136		137		138		139		140		141		142		143		144		145		146		147		148		149		150		151		152		153		154		155		156		157		158		159		160		161		162		163		164		165		166		167		168		169		170		171		172		173		174		175		176		177		178		179		180		181		182		183		184		185		186		187		188		189		190		191		192		193		194		195		196		197		198		199		200		201		202		203		204		205		206		207		208		209		210		211		212		213		214		215		216		217		218		219		220		221		222		223		224		225		226		227		228		229		230		231		232		233		234		235		236		237		238		239		240		241		242		243		244		245		246		247		248		249		250		251		252		253		254		255		256		257		258		259		260		261		262		263		264		265		266		267		268		269		270		271		272		273		274		275		276		277		278		279		280		281		282		283		284		285		286		287		288		289		290		291		292		293		294		295		296		297		298		299		300		301		302		303		304		305		306		307		308		309		310		311		312		313		314		315		316		317		318		319		320		321		322		323		324		325		326		327		328		329		330		331		332		333		334		335		336		337		338		339		340		341		342		343		344		345		346		347		348			
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[illegible]

Data ambig	14.70 pole
Data ambig	537.0 R
Data ambig	70.00%
Data score	1

Data source	1831.18	1722.95	1635.07	1596.27	1552.91	1523.14	1505.73	1500	1505.73	1523.14	1552.91	1596.27	1635.07	1732.05	1831.18	1928.11	2121.32	2333.58	2815.17	3000	3548.73	4385.71	5795.55
distance (km)	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
range (km)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
frequency	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86	47.84	50.81	50.86	50.86	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22	51.22
1000	44.75	48.77	48.86	48.86	48.86	48.86	50.04	48.86															



dog	236
test_dmg	Alison89
test_dmg	1
test_leal	3
test_leal	LPRC APL
test_casi	LeRon
lead_sero	Kathy Boyd
lead_sero	Kathy Boyd
lead_engir	Rex Castner
nairid	NATH w/le wedge
JFH w/external supplement	
DEP20	
mashed	BASE
mozbod	228
moz	228
antic	35.02
scale	78.99
scale	4
v01	917.16
pamb	0.20697
tamb	14.4182
lamb	490.952
rhumd	62.12
winds1	0
repc	1544
repc	1609
pao	22.2617
wide	23.193
wide	2.73
width	163.12
width	1329.96
nc	504.098
pnas	23.0631
snus	824.741
ntspnd	0.74843
grvup	17281.1
bachuan	[23.26]
bgnd	228
ecodeie	22 Nov 89
ecodeie	1635.36
DADUSme	87.063
DADUSme	1635.36
bechime	22 Nov 89
bechime	1635.36

\*Scenario: 150 lbf dog; TFF, 70%, Fun  
Processing off!

Machine 16.35:38  
 Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Mon Aug 16 09:09:30 1997  
 Generation date:

Data ambisi 14.30 pais  
Data ambisi 5.38 0 B

Data limit	536.0 M
Data sample	70.00%
Data scale	1

distance: ( ) 150

year angle	roll angle (°)
55	0

frequency	55
80	73.91
100	74.48

100	74.48
130	76.47
160	76.07

100	75.78
200	78.16

320	77.63
400	76.6

500	77.57
830	77.46
1000	76.80

800	79.82
1000	81.31
1300	81.52

1300	81.35
1600	81.25
2000	80.36

2500	76.83
3200	77.79

4000	77.08
5000	75.87
6000	75.24

6300	75.01
8000	73.92
10000	71.68

10000  
OASPL



id	zsh	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700																								
res_num	1	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55</



dog	237
run	1
test_prog	Alison98
test_num	3
test_facil	LERC API
test_cust	Alison
read_area	Kathy Boyd
read_acous	Kathy Boyd
read_engnr	Ray Castner
material	NATR tul wedge
tabid	JEF w/ external supplement

[illegible]

Date stamp	14.30 puis
Date stamp	538.0 R
Date stamp	70.00%
Date stamp	1

distance: (150

roll angle ( )

80	75.03
----	-------

130	79.38
160	80.48

200	80.21
250	80.77

400 01.44

630 02 04

1000	84.91
1200	85.71

1600	148.38
2000	148.39

2300	83.51
3200	87.04

5000 05 42

3000	83.18
10000	80.48

07.23 OASPL







[illegible]

Data embd: 14.30 psia  
Data ambd: 536.0 R  
Data ambd: 70.00%  
Data scale: 1

distance (°)	150
yaw angle	55
roll angle (°)	0
frequency	55
	80

100	0
130	0
160	0
200	58.73
250	63.8
300	65

400	61.56
500	63.16
630	64.63
800	65.49
1000	65.31

1500	61.80
1600	60.88
2000	58.93
2500	59.83
3200	60.1
4000	58.76

5000	57.8
6300	58.08
8000	58.58
10000	58.88
OASPL	74.16

[illegible]















388

Data ambien 14.30 psia  
Data ambien 536.0 R  
Data ambien 70.00%  
Data grade 1















## **75%L, 12TH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: B, C, D, F, G, H, J, K, L



393

[illegible]



idg	489
run	1
test_prog	Alison98
test_num	3
test_fac2	LeRC APX
test_cust	Allison
lead_aero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engr	Ray Castner
nutrid	NATR full wedge
nutrid	JER w/ external supplement

Screenshot 20:42:20  
 \*\*Scenario: Fly-over, full-scale, 1500' altitude, standard day  
 Wed Aug 20 05:55:52 1997  
 Downloading data

Scarlino: Fly-on-  
Crimson day.

Ques. Answer 14 70 pages

Data arrived 537.0 A

Date	70.00%
------	--------

**DATA SCANS**

Distance: 1837.16

view angle / 55

55  
ACQUITTAL

48.83  
80

100	51.26
120	50.45

130	50.43
160	51.66

200 52.56

250	53.16
300	52.17

34.47  
34.15

500 54.39

54.17 54.18

600 54.82

1000 54.84

1300 54.47

1600	53.87
2000	53.02

2500	51.98
2500	51.98

1200	49.66
1300	49.54

4000	46.54
5000	41.45

33.42

8000 20.08

QASPI 85.53

75.19

Distance (km)	1831.16	1732.05	1655.07	1586.27	1552.91	1523.14	1505.73	1500	1506.73	1523.14	1552.91	1596.27	1655.07	1735.05	1831.16	1958.11	2121.32	2253.59	2615.17	3000	3549.5	4385.71	5795.55
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
not angle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
frequency	48.83	50.05	52.02	53.02	53.74	54.24	54.71	55.15	55.54	55.94	56.34	56.74	57.15	57.58	58.05	58.53	59.02	59.50	60.00	60.50	61.00	61.50	62.00
80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540
100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560
120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580
140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600
160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620
180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640
200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660
220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680
240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720
280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740
300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740	760
320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740	760	780
340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740	760	780	800
360	380	400	4																				







5g	470	un	prog	Alfonso	1
10g	470	un	prog	Alfonso	1
15g	470	un	prog	Alfonso	1
20g	470	un	prog	Alfonso	1
25g	470	un	prog	Alfonso	1
30g	470	un	prog	Alfonso	1
35g	470	un	prog	Alfonso	1
40g	470	un	prog	Alfonso	1
45g	470	un	prog	Alfonso	1
50g	470	un	prog	Alfonso	1
55g	470	un	prog	Alfonso	1
60g	470	un	prog	Alfonso	1
65g	470	un	prog	Alfonso	1
70g	470	un	prog	Alfonso	1
75g	470	un	prog	Alfonso	1
80g	470	un	prog	Alfonso	1
85g	470	un	prog	Alfonso	1
90g	470	un	prog	Alfonso	1
95g	470	un	prog	Alfonso	1
100g	470	un	prog	Alfonso	1
105g	470	un	prog	Alfonso	1
110g	470	un	prog	Alfonso	1
115g	470	un	prog	Alfonso	1
120g	470	un	prog	Alfonso	1
125g	470	un	prog	Alfonso	1
130g	470	un	prog	Alfonso	1
135g	470	un	prog	Alfonso	1
140g	470	un	prog	Alfonso	1
145g	470	un	prog	Alfonso	1
150g	470	un	prog	Alfonso	1
155g	470	un	prog	Alfonso	1
160g	470	un	prog	Alfonso	1
165g	470	un	prog	Alfonso	1
170g	470	un	prog	Alfonso	1
175g	470	un	prog	Alfonso	1
180g	470	un	prog	Alfonso	1
185g	470	un	prog	Alfonso	1
190g	470	un	prog	Alfonso	1
195g	470	un	prog	Alfonso	1
200g	470	un	prog	Alfonso	1
205g	470	un	prog	Alfonso	1
210g	470	un	prog	Alfonso	1
215g	470	un	prog	Alfonso	1
220g	470	un	prog	Alfonso	1
225g	470	un	prog	Alfonso	1
230g	470	un	prog	Alfonso	1
235g	470	un	prog	Alfonso	1
240g	470	un	prog	Alfonso	1
245g	470	un	prog	Alfonso	1
250g	470	un	prog	Alfonso	1
255g	470	un	prog	Alfonso	1
260g	470	un	prog	Alfonso	1
265g	470	un	prog	Alfonso	1
270g	470	un	prog	Alfonso	1
275g	470	un	prog	Alfonso	1
280g	470	un	prog	Alfonso	1
285g	470	un	prog	Alfonso	1
290g	470	un	prog	Alfonso	1
295g	470	un	prog	Alfonso	1
300g	470	un	prog	Alfonso	1
305g	470	un	prog	Alfonso	1
310g	470	un	prog	Alfonso	1
315g	470	un	prog	Alfonso	1
320g	470	un	prog	Alfonso	1
325g	470	un	prog	Alfonso	1
330g	470	un	prog	Alfonso	1
335g	470	un	prog	Alfonso	1
340g	470	un	prog	Alfonso	1
345g	470	un	prog	Alfonso	1
350g	470	un	prog	Alfonso	1
355g	470	un	prog	Alfonso	1
360g	470	un	prog	Alfonso	1
365g	470	un	prog	Alfonso	1
370g	470	un	prog	Alfonso	1
375g	470	un	prog	Alfonso	1
380g	470	un	prog	Alfonso	1
385g	470	un	prog	Alfonso	1
390g	470	un	prog	Alfonso	1
395g	470	un	prog	Alfonso	1
400g	470	un	prog	Alfonso	1
405g	470	un	prog	Alfonso	1
410g	470	un	prog	Alfonso	1
415g	470	un	prog	Alfonso	1
420g	470	un	prog	Alfonso	1

Data ambig	14.70 psia
Data ambig	537.0 R
Data ambig	70.00%
Data scale	1

data set	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data set	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data set	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data set	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data set	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data set	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79																					



[illegible]



[illegible]

**Data अभी 14.70 पेस**

Data ambient 537.0 Å

Data source	70.00%
Data scale	1

1000

distance: (	1031.18	55
view mode		

roll angle (

frequency	55
no	58.7

60 50.7  
100 59.87

130 81 87  
180 82 91

160	62.51
200	62.97

250 82.53

320	53.36
400	52.14

500 62.00

630	62.28
800	63.51

1000 63.43

1300	63.44
1800	62.75

1997	64.13
2000	62.05

2500	60.23
1200	57.59

3200	57.50
4000	54.15

5000	40.50
4300	40.50

6300	40.36
8000	29.37

10000  
7451  
0

DASPL	74.51
PINL	83.88







400

[illegible]



[illegible]



[illegible]

blending 21.31.33  
 \*\*Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Wed Aug 20 08:03:26 1997

Data amb1	14.70 psia
Data amb2	537.0 R
Data amb3	70.00%
Data scale	1

[illegible]

OASF  
PNU



rdg	472
run	1
test_prog	Alison86
test_num	3
test_tech	LEPC APL
test_cust	Alison
test_aero	Kathy Boyd
test_accu	Kathy Boyd
test_engin	Ray Custer
netrid	NATR full wedge
netcid	JER w/ external supplement

Scenarij: 21.13.01  
 Scenarij: 150 foot arc; 77 F, 70%; Full scale; Third-octave SPL  
 Mon Aug 18 11:48:48 1997

Scenario: 150 la  
Presenting data:

Data Sample 14.30 Data

Delta symbol: 538.0 R

Debit	Credit
70.00%	

—

distance: (l) 150

55 0

55 (continued)

7528

100	77.71
100	78.15

130	78.12
160	79.4

200 7955

250	80.91
300	81.02

320	63 02
400	63 51

500 84.13

030 04 02 04 03

1000 89.23

1300 891

1800	89.04
2000	89.14

2500 88.9

3200 64 23

4000	87.16
5000	85.75

54 52

8000 8338

10000	81.1
045PL	99.97

45



[illegible]

data length: 14.70 giga	1831.18	1732.05	1665.07	1596.27	1552.91	1523.14	1500.73	1500	1505.73	1523.14	1552.91	1596.27	1655.07	1732.05	1821.16	1958.11	2121.32	2333.59	2615.17	3000	3549.3	4385.71	5795.55
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
data length: 14.70 giga	55	90	85	70	75																		











[illegible]

Data ambiti 14.30 psja  
Data ambiti 536.0 R  
Data ambiti 70.00%  
Data scale 1

[illegible]

10000  
OASPL



rdg	478
run	1
test_prog	Alison8
test_num	3
test_fac1	LeRC APL
test_fac2	Alison
test_aero	Kathy Boyd
test_acou	Kathy Boyd
test_engr	Ray Casner
natrd	NATR full wedge
trdbd	JER w/ external supplement

Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 21:59:59  
 Wed Aug 20 08:08:55 1997

Scenario: Fly-on  
Discussion date:

Data envio	14.70 pela
Data envio	537 0 R
Data envio	70.00%
Data escala	1

Class	1801.18	1720.05	1635.07	1552.81	1505.73	1500	1450	1350	1250	1150	1050	950	850	750	650	550	450	350	250	150	100	50	10	1
Relative	1801.18	1720.05	1635.07	1552.81	1505.73	1500	1450	1350	1250	1150	1050	950	850	750	650	550	450	350	250	150	100	50	10	1
Frequency	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	60.71	63.22	65.73	68.24	70.75	73.26	75.77	78.28	80.79	83.30	85.81	88.32	90.83	93.34	95.85	98.36	100.87	103.38
Power	45.63	48.16	50.67	53.18	55.69	58.20	6																	



[illegible]



410

Date since 1470 years	1831.18	1732.05	1655.07	1586.27	1532.91	1520.14	1506.73	1500	1506.73	1523.14	1532.91	1596.27	1635.07	1732.05	1831.18	1959.11	2121.39	2333.59	2615.17	3000	3549.3	4385.71	5795.55
Chia annos=337.0 (100%)	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
Chia annos=70 (100%)	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
Chia annos=1	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
duration (t	1831.18	1732.05	1655.07	1586.27	1532.91	1520.14	1506.73	1500	1506.73	1523.14	1532.91	1596.27	1635.07	1732.05	1831.18	1959.11	2121.39	2333.59	2615.17	3000	3549.3	4385.71	5795.55
year angle (t	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
year angle (t	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
frequency	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100%	55	60	65	70	75	80	85	90	95	100													



## **75%L, 20UH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: B, C, D, F, G, H, J, K, L











dog	487
un	1
test_prog	Allison96
test_num	3
test_facil	LeRC APL
test_cust	Allison
read_aero	Kathy Boyd
read_acad	Kathy Boyd
read_engr	Ray Cassner
randb	NATR full wedge
randb	JER w/ external supplement

prog	467
un	1
est_prog	ANLSON96
est_num	3
est_fac1	LeRC APL
est_cust	ANLSON
read_sera	Kathy Boyd
read_socr	Kathy Boyd
read_engr	Ray Castner
rainbald	NATR full w
table	JER w/ exte

bedtime 18:47:02  
 \*\*Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Processing date: Wed Aug 20 05:50:44 1997

Data ambisi 14.30 pada  
Data ambisi 538.0 M  
Data ambisi 70.00%  
Data acabo 1

distance: (150 m)

roll angle /  
yaw angle

Frequency	Amplitude
55	55

78.22 80

100 79.14

130	78.84
131	80.94

160	50.64
200	51.48

200	81.40
250	80.53

320 81.88

400 01.10

500	61.87
130	61.2

630	81.2
800	81.54

1000 01.50

1300 01.75

1600	81.89
2000	82.82

2000	80.93
2500	79.61

79.13  
3200

4000 77.84

5000	70.26
------	-------

6300	74.56
8000	72.93

60000	72.83
100000	69.32

**DASPL** 93.41



Data ambisi	14.70 pela
Data ambisi	537.0 R
Data ambisi	70.00%
Data scale	1

Distance (km)	1831.16	1732.05	1655.07	1598.27	1552.81	1523.14	1505.73	1500	1506.73	1523.14	1552.81	1598.27	1655.07	1732.05	1831.16
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
100	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
150	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
200	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
250	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
300	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
350	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
400	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
450	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
500	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
550	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
600	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
650	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
700	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
750	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
800	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
850	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
900	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
950	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
1000	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
1050	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
1100	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
1150	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
1200	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
1250	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
1300	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
1350	55	60	65	70	75	80									



[illegible]



















[illegible]



[illegible]

Data ambire 14.30 postea  
Data ambire 538.0 R  
Data ambire 70.00%  
Data scale 1

[illegible]



tdg	463
run	1
test_prog	Atkinson
test_num	3
test_facil	LEPC APL
test_cust	Atkinson
test_sens	Kathy Boyd
test_acou	Kathy Boyd
test_engr	Play Cadster
matbns	NATR ltr wedge
refr	external supplement

Scenario: Fly-over, full-scale, 1500' sideline, standard day  
Processing date: Mon Aug 18 11:25:41 1997

Data armbt	14.70 ps/s
Data armbt	537.0 R
Data armbt	70.00%
Data scale	1

distance (°)	1831.18	1732.05	1655.07	1598.27	1550.81	1523.14	1506.73	1490.73	1475.14	1459.73	1444.73	1429.73	1414.73	1400.00	1385.73	1372.05	1358.73	1345.73	1332.14	1319.73	1306.73	1293.73	1280.73	1267.73	1254.73	1241.73	1228.73	1215.73	1202.73	1189.73	1176.73	1163.73	1150.73	1137.73	1124.73	1111.73	1098.73	1085.73	1072.73	1059.73	1046.73	1033.73	1020.73	1007.73	994.73	981.73	968.73	955.73	942.73	929.73	916.73	903.73	890.73	877.73	864.73	851.73	838.73	825.73	812.73	799.73	786.73	773.73	760.73	747.73	734.73	721.73	708.73	695.73	682.73	669.73	656.73	643.73	630.73	617.73	604.73	591.73	578.73	565.73	552.73	539.73	526.73	513.73	500.73	487.73	474.73	461.73	448.73	435.73	422.73	409.73	396.73	383.73	370.73	357.73	344.73	331.73	318.73	305.73	292.73	279.73	266.73	253.73	240.73	227.73	214.73	201.73	188.73	175.73	162.73	149.73	136.73	123.73	110.73	97.73	84.73	71.73	58.73	45.73	32.73	19.73	6.73	-7.73	-20.73	-33.73	-46.73	-59.73	-72.73	-85.73	-98.73	-111.73	-124.73	-137.73	-150.73	-163.73	-176.73	-189.73	-202.73	-215.73	-228.73	-241.73	-254.73	-267.73	-280.73	-293.73	-306.73	-319.73	-332.73	-345.73	-358.73	-371.73	-384.73	-397.73	-410.73	-423.73	-436.73	-449.73	-462.73	-475.73	-488.73	-501.73	-514.73	-527.73	-540.73	-553.73	-566.73	-579.73	-592.73	-605.73	-618.73	-631.73	-644.73	-657.73	-670.73	-683.73	-696.73	-709.73	-722.73	-735.73	-748.73	-761.73	-774.73	-787.73	-800.73	-813.73	-826.73	-839.73	-852.73	-865.73	-878.73	-891.73	-904.73	-917.73	-930.73	-943.73	-956.73	-969.73	-982.73	-995.73	-1008.73	-1021.73	-1034.73	-1047.73	-1060.73	-1073.73	-1086.73	-1099.73	-1112.73	-1125.73	-1138.73	-1151.73	-1164.73	-1177.73	-1190.73	-1203.73	-1216.73	-1229.73	-1242.73	-1255.73	-1268.73	-1281.73	-1294.73	-1307.73	-1320.73	-1333.73	-1346.73	-1359.73	-1372.73	-1385.73	-1398.73	-1411.73	-1424.73	-1437.73	-1450.73	-1463.73	-1476.73	-1489.73	-1502.73	-1515.73	-1528.73	-1541.73	-1554.73	-1567.73	-1580.73	-1593.73	-1606.73	-1619.73	-1632.73	-1645.73	-1658.73	-1671.73	-1684.73	-1697.73	-1710.73	-1723.73	-1736.73	-1749.73	-1762.73	-1775.73	-1788.73	-1801.73	-1814.73	-1827.73	-1840.73	-1853.73	-1866.73	-1879.73	-1892.73	-1905.73	-1918.73	-1931.73	-1944.73	-1957.73	-1970.73	-1983.73	-1996.73	-2009.73	-2022.73	-2035.73	-2048.73	-2061.73	-2074.73	-2087.73	-2100.73	-2113.73	-2126.73	-2139.73	-2152.73	-2165.73	-2178.73	-2191.73	-2204.73	-2217.73	-2230.73	-2243.73	-2256.73	-2269.73	-2282.73	-2295.73	-2308.73	-2321.73	-2334.73	-2347.73	-2360.73	-2373.73	-2386.73	-2399.73	-2412.73	-2425.73	-2438.73	-2451.73	-2464.73	-2477.73	-2490.73	-2503.73	-2516.73	-2529.73	-2542.73	-2555.73	-2568.73	-2581.73	-2594.73	-2607.73	-2620.73	-2633.73	-2646.73	-2659.73	-2672.73
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[illegible]



ndg	461
run	1
test_prog	Atkinson
test_num	3
test_incl	LeRC APL
test_cust	Allison
lead_aero	Kathy Boyd
lead_scoo	Kathy Boyd
lead_engnr	Ray Cashner
trainind	NATR full wedge
nchid	JER full external supplement

```

bchtime 17:38:58
--Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL
Processing date: Wed Aug 20 05:38:37 1997

```

Spencer, D.C. 71, 1990, 1991

Data number 14.300 passed  
 Data number 530.0 A

Date	70.00%
------	--------

Date rec'd 1

150

150 55  
duration: ( weeks and

roll angle (°) 0

frequency 55

80	58.33
100	70.70

100	70.75
130	71.35

130	71.33
180	72.34

200	73.41
-----	-------

250 74.83

320	76
400	78 16

400	75.48
500	78.58

76 71

78.66

1000	79.25
1000	79.25

1300	79.20
1200	78.75

1600	78.73
2000	78.06

2500 77 00

3200 78.41

4000	75.53
5000	74.22

5000	74.22
6300	73.71

73.39

10000 72.55

OASPL 59.4



Scenario: Fly-over, full-scale, 1500' sidefire, standard day  
Wed Aug 20 05:38:43 1997  
Processing date:  
bchirms 17:39:58

Data anni 14 70 pole  
 Data anni 537 0 A  
 Data anni 70 00%  
 Data scale 1

[illegible]



NASA Lewis Allison AST Jet Noise Test 1998

[illegible]

**Data arrivo 14.30 ps/e**

Date	embled	538.0 Ft
Date	embled	70.00%

Costa 1990	100%
Data 1990	1

150

distance: (1)	150
yaw angle	55

roll angle (°) 0

Frequency	80	74.43	55
-----------	----	-------	----

100 75.24

130	75.82
180	78.43

100	76.42
200	76.53

250	78.52
230	79.74

350	79.74
400	80.18

500 01.16

630	81.21
600	82.91

1000	83.58
1000	84.54

1300	64.58
1600	64.71

2000	84.31
------	-------

2500	83.19
3200	81.8

4000 80.53

5000	78.9
8300	77.03

8300 77.82  
8000 76.36

10000	74.68
04581	84.28

74590 03.08



[illegible]



## **75%L, 20DH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL

1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL

Operating Conditions: B, C, D, F, G, H, J, K, L







[illegible]

brighttime 15:54:00  
 ...Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Wed Aug 20 05:33:57 1997

Data ambis	14.70 pairs
Data ambis	537.0 R
Data ambis	70.00%
Data scale	1

[illegible]







[illegible]

Data amplitude: 14.70 psu  
Data amplitude: 537.0 ft  
Data amplitude: 70.00%  
Data scale: 1

[illegible]



prog	454
run	1
test_prog	Alison98
test_num	3
test_fac	LeRC APL
test_cust	Alison
test_sero	Kathy Boyd
test_soul	Kathy Boyd
test_engin	Riley Cushman
testbed	NATR full wedge
testbed	JER w/external supplement

[illegible]

Data sample 14.30 psda
Data sample 536.0 A
Data sample 70.00%

**Data scale** 1

2000

distance: (1 150

55

roll angle (°) 0

55 Abenteuer

82.7 80

100 13.35

130 84.94

150 07.20

200 96.45

250 85.35

320 85.93

400 85.15

05,54

85.40

15.84

1000 00.18

1300 85.69

1000	85.3
------	------

2000 84.69

2500 83.7

3200 82.7

4000 \$1.77

5000 80.33

70.0

77.55  
8000

10000 74.85

QASPL 07.008

1



436

Data ambli	14.70 pais
Data ambli	537.0 Ft
Data ambli	70.00%
Data scale	1

[illegible]



[illegible][illegible]







dog	452
east	1
Alston	
rest num	3
LARC APL	
not clear	
Kathy Boyd	
Scott Boyd	
Scott Boyd	
Ray Casner	
united	
NATR but wedge	
JER w external supplement	
DP20	
model	
SH20	41,226
meoz	35.02
meoz	76.39
meoz	4
meoz	922.35
meoz	0.206
meoz	14.185
meoz	496.767
meoz	58.5
meoz	0
meoz	1.542
meoz	1.811
meoz	21.8424
meoz	22.8198
meoz	2.700
meoz	116.04
meoz	119.35
meoz	502.335
meoz	22.6799
meoz	0.755963
meoz	17287.5
meoz	[26]
meoz	445
meoz	05 Dec 96
meoz	15.1606
meoz	04030405 Dec 96
meoz	04030405 Dec 96
meoz	04030405 Dec 96
meoz	15.1606

Data ambiti 14.30 peris  
Data ambiti 536.0 R  
Data ambiti 70.00%  
Data scale 1

distance: (°)	150
yaw angle	55

roll angle (°)	frequency
0	80
55	70.35
70.35	79.72
79.72	100

100	73.73
130	73.6
160	75.43
200	74.95

250	76.44
320	77
400	78.73

500	77.24
630	76.83
800	77.29
1,000	77.80

1000	77.82
1300	78.1
1600	77.28
2000	77.24

2500	76.39
3200	78.26
4000	75.17

5000	73.93
6300	72.98
8000	72.18
10000	70.67

10000	70.51
OASPL	89.27

backtime 15:16:08  
 \*\*\*\*\*Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Processing date: Wed Aug 20 05:28:07 1997

Dalle ombre 14.30 posticipate  
Dalle ombre 5.000 n. 12

Data source	70.00%
Data split	1
Data scale	1

distance: (i	150	150	150	150
view angle	55	60	65	70

roll angle (°)	frequency	roll angle (°)	frequency
0	0	0	0
55	60	85	70
70.35	71.11	71.66	72.13
80	80		

100	73.73	74.38	74.73	74.92	75.00
130	73.6	74.23	74.44	74.51	74.55
160	75.43	75.86	76.18	76.29	76.33

100	76.46	76.18	76.86	77.28	77.7
200	74.95	76.14	76.86	77.28	77.7
250	76.44	77.29	77.75	78	78.1
300	77	77.84	78.38	78.81	79.3

320	77	77.84	76.20	76.31
400	76.73	77.4	77.62	77.86
500	77.24	76.22	76.56	76.64

630	76.83	78.53	78.76	78.69	78.53
800	77.29	79.49	79.62	79.48	79.33
1000	77.92	80.36	79.71	79.44	79.99

	1300	78.1	79.64	79.59	79.55	79.71
1500		77.28	78.93	79.36	79.7	80.00
2000		77.24	78.75	79.38	79.8	80.3

2500	76.39	78.12	78.96	79.92	80.77
3200	76.26	77.47	78.42	79.8	80.77
4000	75.17	76.84	77.93	79.39	80.2

[illegible]

10000	70.57	72.24	72.08	74.8	75.1
OASPL	69.27	90.75	91.1	91.0	91.0

[illegible]























distance: (i new angle total angle (°)	frequency	55	55	150
80	68.91	0	0	0
100	71.4	0	0	0
130	71.26	0	0	0
180	71.56	0	0	0
200	71.94	0	0	0
250	74.15	0	0	0
320	74.9	0	0	0
400	73.69	0	0	0
500	74.87	0	0	0
630	74.79	0	0	0
800	76.13	0	0	0
1000	76.23	0	0	0
1300	76.78	0	0	0
1600	76.36	0	0	0
2000	76.04	0	0	0
2500	75.78	0	0	0
3200	75.95	0	0	0
4000	75.46	0	0	0
5000	74.37	0	0	0
6300	73.62	0	0	0
8000	73.64	0	0	0
10000	72.61	0	0	0
QASPL	80.13	0	0	0



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87													

[illegible]



bedtime 14:51:40  
 \*\*\*Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Wed Aug 27 11:14:53 1997  
 Processing date:

Data ambig 14.30 posin  
Data ambig 538.0 R  
Data ambig 70.00%  
Data scale 1

[illegible]



[illegible]



## **50%L, 12CL**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L











[illegible]

Data ambles 14.30 psla  
Data ambles 536.0 A  
Data ambles 70.00%

[illegible]











Data index	1470 psi	1821.18 psi	55
Data time	537.0 H		55
Data time	70.00%		55
Data scale			55
distance (in)	80	100	57.32
year (angle)	180	180	57.61
roll angle (in)	130	130	54.48
frequency	180	180	56.8
	200	200	59.56
	250	250	59.76
	320	320	59.82
	400	400	59.82
	500	500	59.59
	630	630	57.44
	800	800	56.8
	1000	1000	55.98
	1300	1300	55.02
	1600	1600	53.6
	2000	2000	52.16
	2500	2500	49.60
	3000	3000	47.16
	4000	4000	43.02
	5000	5000	38
	6300	6300	30.11
	8000	8000	13.66
	10000	10000	0
OASPL	68.73		
PNL	75.95		



g	n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
st_prog	st_num	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572																																																																																																																																																																																																																																																																																																																																																																																																																																														











dog	276
run	1
test_prog	Alison98
test_num	3
test_fac1	LeRC AP1
test_cust	Alison
test_serv	Kathy Boyd
test_acou	Kathy Boyd
test_engr	Ray Cashner
testobj	NATR tub wedge
testobj	JER w/ external supplement

bedtime 17:19:15  
 \*\*Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Release date: Wed Aug 20 01:58:37 1997

Data ambón	14.70 pesos
Data ambón	537.0 R
Data ambón	70.00%
Data scale	1

Date: aacc	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523
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6: Full scale; Third-octave SPL  
Mon Aug 18 10:55:48 1987



[illegible]







[illegible]

1831.16	1732.05	1853.07	1596.27	1552.91	1523.14	1506.73	1500	1505.73	1523.14	1522.91	1596.27	1853.07	1732.05	1831.16
55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
Distance: (														
Angle														
Frequency														
100	53.51	55.75	54.82	57.51	58.07	56.81	58.01	56.72	58.55	57.37	57.36	57.48	57.36	57.48
150	48.25	51.18	53.99	55.31	56.81	57.16	56.72	58.55	56.52	58.05	56.46	58.13	56.28	58.13
180	53.36	53.96	56.81	56.18	56.08	57.01	58.4	59.25	58.56	56.71	60.96	61.32	61.74	62.92
200	53.72	56.22	56.14	56.84	57.9	58.76	58.57	59.44	59.96	60.91	60.95	62.08	61.92	61.79
250	53.06	54.62	56.72	57.89	58.12	58.75	59.53	59.58	60.32	60.71	60.23	61.13	61.17	61.58
300	55.45	56.56	57.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
350	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
400	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
450	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
500	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
550	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
600	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
650	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
700	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
750	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
800	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
850	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
900	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
950	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
1000	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
1050	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
1100	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
1150	54.51	56.04	56.88	58.27	58.52	59.39	59.52	60.64	60.8	62.82	62.82	63.76	63.76	64.14
1200	54.51	56.04	56.88	58.2										



464

Data amb 14.30 pda	
Data amb 536.0 FI	
Data amb 70.00%	1
Data amb	

Data amb 14.30 pda	
Data amb 536.0 FI	
Data amb 70.00%	1
Data amb	



16	273	un	2009	Alomgong	41,226
		2	2009	Alomgong	35,02
		3	2009	Alomgong	78,39
		4	2009	Alomgong	890,09
		5	2009	Alomgong	0,0005
		6	2009	Alomgong	14,2047
		7	2009	Alomgong	501,637
		8	2009	Alomgong	98,09
		9	2009	Alomgong	0
		10	2009	Alomgong	1,742
		11	2009	Alomgong	1,82
		12	2009	Alomgong	26,0104
		13	2009	Alomgong	3,443
		14	2009	Alomgong	18,207
		15	2009	Alomgong	1,367,06
		16	2009	Alomgong	446,265
		17	2009	Alomgong	25,839
		18	2009	Alomgong	937,898
		19	2009	Alomgong	0,0075
		20	2009	Alomgong	1,054,9
		21	2009	Alomgong	264
		22	2009	Alomgong	25,866
		23	2009	Alomgong	16,5026
		24	2009	Alomgong	97,0625
		25	2009	Alomgong	18,5026
		26	2009	Alomgong	25,866
		27	2009	Alomgong	25,866
		28	2009	Alomgong	25,866
		29	2009	Alomgong	25,866
		30	2009	Alomgong	25,866

bitstream 16:50:28  
---Scenario: Fly-over, full-scale, 1500' timeline, standard day  
Processing date: Wed Aug 27 10:20:54 1997

Data arriba 14.70 pela  
Data arriba 537.0 R  
Data arriba 70.00%  
Data arriba 1

[illegible]



[illegible][illegible]



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[illegible]



rdg	276
run	1
press_prog	Alison86
press_num	3
press_facil	LEPC APL
press_cust	Alison
seed_aero	Kathy Boyd
seed_accou	Kathy Boyd
seed_engr	Ray Cushman
material	NATR tul wedge
includ	JER w/ external supplement

bchtime 17:42:14  
 ..Scenario: Fly-over, full-scale, 1500 sideline, standard day  
 Discussion date: Wed Aug 20 02:05:08 1997

Data ambiti 14.70 più  
 Data ambiti 537.0 R  
 Data ambiti 70.00%  
 Data scade 1

Year	1881-18	1882-89	1890-99	1900-09	1910-19	1920-29	1930-39	1940-49	1950-59	1960-69	1970-79	1980-89	1990-99	2000-09	2010-19	2020-29	2030-39	2040-49	2050-59	2060-69	2070-79	2080-89	2090-99	2100-09	2110-19	2120-29	2130-39	2140-49	2150-59	2160-69	2170-79	2180-89	2190-99	2200-09	2210-19	2220-29	2230-39	2240-49	2250-59	2260-69	2270-79	2280-89	2290-99	2300-09	2310-19	2320-29	2330-39	2340-49	2350-59	2360-69	2370-79	2380-89	2390-99	2400-09	2410-19	2420-29	2430-39	2440-49	2450-59	2460-69	2470-79	2480-89	2490-99	2500-09	2510-19	2520-29	2530-39	2540-49	2550-59	2560-69	2570-79	2580-89	2590-99	2600-09	2610-19	2620-29	2630-39	2640-49	2650-59	2660-69	2670-79	2680-89	2690-99	2700-09	2710-19	2720-29	2730-39	2740-49	2750-59	2760-69	2770-79	2780-89	2790-99	2800-09	2810-19	2820-29	2830-39	2840-49	2850-59	2860-69	2870-79	2880-89	2890-99	2900-09	2910-19	2920-29	2930-39	2940-49	2950-59	2960-69	2970-79	2980-89	2990-99	3000-09	3010-19	3020-29	3030-39	3040-49	3050-59	3060-69	3070-79	3080-89	3090-99	3100-09	3110-19	3120-29	3130-39	3140-49	3150-59	3160-69	3170-79	3180-89	3190-99	3200-09	3210-19	3220-29	3230-39	3240-49	3250-59	3260-69	3270-79	3280-89	3290-99	3300-09	3310-19	3320-29	3330-39	3340-49	3350-59	3360-69	3370-79	3380-89	3390-99	3400-09	3410-19	3420-29	3430-39	3440-49	3450-59	3460-69	3470-79	3480-89	3490-99	3500-09	3510-19	3520-29	3530-39	3540-49	3550-59	3560-69	3570-79	3580-89	3590-99	3600-09	3610-19	3620-29	3630-39	3640-49	3650-59	3660-69	3670-79	3680-89	3690-99	3700-09	3710-19	3720-29	3730-39	3740-49	3750-59	3760-69	3770-79	3780-89	3790-99	3800-09	3810-19	3820-29	3830-39	3840-49	3850-59	3860-69	3870-79	3880-89	3890-99	3900-09	3910-19	3920-29	3930-39	3940-49	3950-59	3960-69	3970-79	3980-89	3990-99	4000-09	4010-19	4020-29	4030-39	4040-49	4050-59	4060-69	4070-79	4080-89	4090-99	4100-09	4110-19	4120-29	4130-39	4140-49	4150-59	4160-69	4170-79	4180-89	4190-99	4200-09	4210-19	4220-29	4230-39	4240-49	4250-59	4260-69	4270-79	4280-89	4290-99	4300-09	4310-19	4320-29	4330-39	4340-49	4350-59	4360-69	4370-79	4380-89	4390-99	4400-09	4410-19	4420-29	4430-39	4440-49	4450-59	4460-69	4470-79	4480-89	4490-99	4500-09	4510-19	4520-29	4530-39	4540-49	4550-59	4560-69	4570-79	4580-89	4590-99	4600-09	4610-19	4620-29	4630-39	4640-49	4650-59	4660-69	4670-79	4680-89	4690-99	4700-09	4710-19	4720-29	4730-39	4740-49	4750-59	4760-69	4770-79	4780-89	4790-99	4800-09	4810-19	4820-29	4830-39	4840-49	4850-59	4860-69	4870-79	4880-89	4890-99	4900-09	4910-19	4920-29	4930-39	4940-49	4950-59	4960-69	4970-79	4980-89	4990-99	5000-09	5010-19	5020-29	5030-39	5040-49	5050-59	5060-69	5070-79	5080-89	5090-99	5100-09	5110-19	5120-29	5130-39	5140-49	5150-59	5160-69	5170-79	5180-89	5190-99	5200-09	5210-19	5220-29	5230-39	5240-49	5250-59	5260-69
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473



## **50%L, 12UH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L



[illegible]



476







[illegible]







rdg	215
run	1
test_prog	Alison98
test_num	3
test_fool	LoRC APL
test_cust	Alison
lead_hero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engin	Ray Cassner
natrod	NATR full wedge
natrod	JER full external supplement

bichroma 18:48:45  
 -----Scenario: Fly-over, full-scale, 1500' altitude, standard day  
 Fri Aug 22 14:11:36 1997  
 Processing date:

Data ambient 14.70 psi  
Data ambient 537.0 A  
Data ambient 70.00%  
Data scale 1

[illegible]











	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	52
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Data ambiti 14.30 pass  
Data ambiti 536.0 R  
Data ambiti 70.00%  
Data scale 1

[illegible]



prog	220
run	1
test_prog	Allison96
test_num	3
test_fac1	LeRC APL
test_cust	Allison
read_aero	Kathy Boyd
read_aero	Kathy Boyd
read_engr	Rory Cashner
marked	NATR full wedge
noted	JER full external supplement

bedtime 19:35:40  
 ---Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Wed Aug 20 00:39:21 1997

Data ambles	14.70 psia
Data ambles	537.0 ft
Data ambles	70.00%
Data scale	1

[illegible]

PMU 60.45



485

[illegible]



id	un	group	Altozorg	219
1	un	group	Altozorg	219
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96	un	group	Altozorg	219
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Data ambli	14.70 posis
Data ambli	537.0 R
Data ambli	70.00%
Data scale	1

distance (year angle)	1831.16	1732.05	1655.07	1598.27	1553.91	1523.14	1505.73	1500	1505.73	1523.14	1552.81	1594.27	1655.07	1732.05	1801.18	1858.11	2121.22	2303.59	2615.17	3000	3549.3	4385.71	5795.55
0	0	0	0	0	0	0	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
5	55	80	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
10	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
15	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
20	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
25	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
30	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
35	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
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45	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
50	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
55	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
60	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
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75	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
80	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
85	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
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95	80	85	85	70	75	80	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
100	80	85	85	70	75	80	80	8															



tdg	210
run	1
test_prog	Alison96
test_num	3
test_facil	LoRC APL
test_cust	Alison
sead_sero	Kathy Boyd
sead_acou	Kathy Boyd
sead_engnr	Ray Cashner
matrid	NATR tul wedge
tblid	JER w/ external supplement

bchtime 19:21:07  
 ---Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Processing date: Wed Aug 20 00:38:32 1997

Data ambli	14.30 paia
Data ambli	538.0 A
Data ambli	70.00%
Data scale	1

distance: (i	150
100	55

roll angle (°)	frequency
0	55

80	70.47
100	72.35
130	75.88

180	75.6
200	75.81
250	77.15

230	77.16
320	78.58
400	79.15

500	79.36
630	79.88
800	81.37

1000	82.5
1300	83.14
1600	83.47

1600	83.47
2000	82.54
2500	81.7

3200	60.3
4000	78.29
5000	76.57

6300	75.04
8000	73.92
10000	71.47

OASPL 92.77

[illegible]



	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727
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489

OASPL



ndg	217
run	1
test_prog	Allison88
test_num	3
test_loc1	LaPC AP1
test_cust	Allison
test_aero	Kathy Boyd
lead_aero	Kathy Boyd
lead_engr	Ray Caster
matribd	NATR lat wedge
ncbnd	JER w/ external supplement

bedtime 10:11:02  
 ---Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Mon Aug 18 16:52:29 1997

Scanned: 11/1/00  
Processing date:

Deutscher 14.70 €

Data number: 5337.0 A

<b>Data sample</b>	<b>70.00%</b>
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Date rec'd \_\_\_\_\_

1931 18

your angles 55

roll angle (°) 0

frequency	25	55
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86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

80	53.79
100	64.71

130	57.28
130	57.28

180 57.30

200 57.94

250 59.67  
250 59.77

360 59.5

500 59.9

530 59.02

600	61.13
1,000	61.61

1000	61.51
1300	61.81

1800	61.51
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2000 60.04

2500	57.67
3000	54.79

4200	49.88
3500	51.83

41.46  
5000

8300 30.85

0000

0	100000
71.84	0.4581

PM 82.4

Distance	1831.18	1732.05	1665.07	1596.27	1552.81	1505.73	1500	1505.73	1523.14	1552.81	1665.07	1732.05	1831.18	1058.11	2121.32	2303.59	2015.17	3000	3548.31	4395.71	5795.55
period	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
frequency	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
10	53.78	57.99	58.41	58.52	58.56	58.58	58.59	57.98	56.92	60.08	59.81	59.5	59.44	59.72	61.33	63.32	63.42	63.78	63.82	63.95	62.95
20	54.71	56.14	56.81	56.85	56.78	56.9	56.93	56.96	56.69	58.43	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
30	54.78	56.28	56.59	56.35	56.48	56.35	56.41	56.39	56.09	58.01	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
40	54.71	56.14	56.81	56.85	56.78	56.9	56.93	56.96	56.69	58.43	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
50	54.78	56.28	56.59	56.35	56.48	56.35	56.41	56.39	56.09	58.01	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
60	54.71	56.14	56.81	56.85	56.78	56.9	56.93	56.96	56.69	58.43	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
70	54.78	56.28	56.59	56.35	56.48	56.35	56.41	56.39	56.09	58.01	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
80	54.71	56.14	56.81	56.85	56.78	56.9	56.93	56.96	56.69	58.43	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
90	54.78	56.28	56.59	56.35	56.48	56.35	56.41	56.39	56.09	58.01	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
100	54.71	56.14	56.81	56.85	56.78	56.9	56.93	56.96	56.69	58.43	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
110	54.78	56.28	56.59	56.35	56.48	56.35	56.41	56.39	56.09	58.01	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
120	54.71	56.14	56.81	56.85	56.78	56.9	56.93	56.96	56.69	58.43	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
130	54.78	56.28	56.59	56.35	56.48	56.35	56.41	56.39	56.09	58.01	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
140	54.71	56.14	56.81	56.85	56.78	56.9	56.93	56.96	56.69	58.43	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
150	54.78	56.28	56.59	56.35	56.48	56.35	56.41	56.39	56.09	58.01	61.15	61.98	61.78	61.84	63.25	65.32	65.12	65.28	65.51	65.03	64.95
160	54.71	56.14	56.81	56.85	56.78	56.9	56.93	56.96	56.69	58.43	61.15	61.98	61.78	61.84	63.25						







[illegible]







494



rdg	223
run	1
test_prog	Alison86
test_num	3
test_fac1	LeRC APL
test_cust	Allison
test_sero	Kathy Boyd
test_scol	Kathy Boyd
test_engin	Ray Casner
test_natrl	NATR full wedge
test_jer	JER w/ external supplement

bioassay	ALAT <sup>a</sup> full wedge	JEI w/ external supplement
nasaloid	100	100
riboid	100	100

[illegible]

41.226	41.226
35.02	35.02

78.39	
00.00	

950.85

0.30327	mmol
14.1982	perm
104.422	

termo	496.508
rhumid	64.13

Wiederholungsintervall	0
Wiederholungsrate	1,542

npfb	1.816
ptc	21.8838

ptb	22.9443
wavc	3.06

Wactb	15,441
Mc	1319.14

FD	503.296
DAVIS	22.7705

mean	538.234
standard	0.767514

graylog	175.88
hadoop	127.24.25.201

24 Nov 66 225

```

enddata      21 NOV 90
endtime      20:09:47
end          21 NOV 90

```

DADSignal 21.NOV.90  
DADTime 20:09:47

blchdate	21.Nov.09
blchtime	20:09:47

--Scenario: 150 foot arc: 77F, 70%; Fuel  
Processing date: Wed A

Date embek 14.30 pasia

Data arrivo	536.0 R
Data arrivo	70.00%

Data scale 1

distances: (i)	150	150
view spots	55	60

roll angle (°)	roll angle (°)
0	0
5	5

frequency	55	60
80	68.4	70.65
100	80.8	71.93

100	66.51	71.33	7
130	70.89	72.04	7
155	74.84	74.74	7

160	71.93	72
200	72.59	75.13

250	74.03	76.81	7
320	76.88	79.67	8

400	77.43	80.59	8
500	77.76	81.55	8

630	78.77	82.88	8
800	80.54	85.28	8

1000	81.75	86.55
1300	82.85	87.83

1000	82.6	87.68
1800	82.1	88.39

2000	80.44	84.88
2500	78.80	82.55

3200	76.36	80.4	76.67
4000	76.65		74.76
5000			

5000	74.73	76.87
6300	73.88	77.47
7500	73.03	76.62

8000	72.40	76.82
10000	70.89	75.08

CASPL	01.50	95.09	0
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idg	224
run	1
test_prog	Allison96
test_num	3
test_incl	LeRC APL
test_cust	Allison
lead_aero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engr	Rory Cassner
lead_rtd	NATR/RU wedge
lead_rtd	JER w/ internal subelement
model	

[illegible]

Data ambig	14.70 poia
Data ambig	537.0 A
Data ambig	70.00%

[illegible]



## 50% L, 12TH

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L











502

Date ambi 14.30 posla  
Data ambi 536.0 Pa  
Data ambi 70.00%  
Data scale 1

[illegible]



run 387  
test\_prog Affan08  
test\_run 3  
test\_fac LeRC APL  
test\_cdr Allison  
test\_aero Kelly Boyd  
test\_mech Kelly Boyd  
test\_engr Ray Cautner  
nairid01 NATRI full wedge  
nairid02 JER w external supplement  
nairid03 TONG  
nairid04 SH50  
nairid05 41.226  
nairid06 35.02  
nairid07 78.39  
nairid08 848.37  
nairid09 0.00481  
nairid10 14.3222  
nairid11 500.708  
nairid12 78.34  
nairid13 0  
nairid14 1.395  
nairid15 1.448  
nairid16 19.8795  
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nairid19 10.139  
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rdg	396
run	1
test_prog	Allison86
test_num	9
test_fac1	LoPC AP1
test_cust	Allison
lead_sera	Kathy Boyd
lead_sera	Kathy Boyd
lead_engr	Ray Cashner
natrod	NATR full wedge
natrod	JER w/ external supplement

Machine 20:03:19  
 Scenario: Fly-over, full-scale, 1500 sideline, standard day  
 Processing date: Wed Aug 20 04:27:12 1997

Data sample 14.70 psia  
Data sample 537.0 ft  
Data sample 70.00%  
Data sample 1

[illegible]







[illegible]







509







511

Data ambiti 14.70 psia  
Dalla ambiti 537.0 ft  
Data ambiti 70.00%  
Data scale 1

Distance (km)	1851.18	1722.05	1655.07	1592.27	1552.81	1532.14	1505.73	1500	1505.73	1523.14	1552.81	1592.27	1655.07	1732.05	1831.18	1958.11	2121.32	2333.96	2615.17	3000	3549.73	4395.71	5795.55
Year angle	55	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
Frequency	80	42.23	46.18	48.45	46.56	48.65	47.18	50.16	47.63	45.95	48.81	50.45	50.72	50.98	51.24	53.18	52.99	52.76	51.86	51.57	54.86	48.89	165 PWL
100	44.28	43.7	47.09	47.41	47.74	47.96	47.18	50.16	47.63	45.95	48.81	50.45	50.72	50.98	51.24	53.18	52.99	52.76	51.86	51.57	54.86	48.89	165 PWL
130	44.04	46.17	47.96	48.16	47.96	48.16	47.96	50.16	47.63	45.95	48.81	50.45	50.72	50.98	51.24	53.18	52.99	52.76	51.86	51.57	54.86	48.89	165 PWL
160	44.04	46.17	47.96	48.16	47.96	48.16	47.96	50.16	47.63	45.95	48.81	50.45	50.72	50.98	51.24	53.18	52.99	52.76	51.86	51.57	54.86	48.89	165 PWL
200	50.05	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	165 PWL
260	52.6	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	54.63	165 PWL
300	52.48	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	54.25	165 PWL
400	53.08	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	55.84	165 PWL
500	53.1	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	56.14	165 PWL
600	53.83	57.19	56.46	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	165 PWL
800	54.56	57.78	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04	165 PWL
1000	55.1	57.87	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	165 PWL
1200	55.1	57.87	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	58.14	165 PWL
1400	55.1	57.87	58.14	58.14	58.14	5																	







ndg	401	
run	1	Alison88
test_prog	3	
test_num		LeRC APL
test_facil		Alison
test_cust		Kathy Boyd
test_aero		Kathy Boyd
test_acou		Ray Cassner
test_engr		NATR full wedge
numbid		JER w/external supplement

bichrome 20:48:07  
 --Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Wed Aug 20 04:34:37 1997

Data embits 14.70 ps/s  
Data ambits 537.0 R  
Data ambon 70.00%  
Data scale 1

[illegible]



rdg	400
run	1
test_prog	Allison88
test_num	3
test_lack	LeftC API
test_cust	Allison
test_sero	Kathy Boyd
test_accu	Kathy Boyd
test_engr	Ray Castner
matrid	NATR full wedge
external	JER w/external supplement

bedtime 20:32:45  
 --Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Processing date: Mon Aug 16 11:45:50 1997

Data ambi 14.30 post  
Data ambi 536.0 R  
Data ambi 70.00%  
Data scala ?

[illegible]



515

Data ambia	14.70 posiz
Data ambia	537.0 fl
Data ambia	70.00%
Data scale	1







19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	58																																																																																																																																																																																																																																																																																																																																																																																																									



[illegible]

Date: 06/04/2014 14:30:00

Date: 01/01/2001

70.00%

Date Recd:

distance: 0  
157

view and/or  
discussion. (1)

roll angle (°)

frequency 55

008

0	100
100	100

130	66.5
160	68.43

200 70.06

250	73.26
-----	-------

320	74.36
400	75.0

400	75.2
500	79.98

77.76

800 79.1

1000	80.16
1000	81.51

1300	61.21
1500	80.93

1000	81.14
2000	81.14

2500 80.78

1200 80.39

4000	78.92
5000	77.38

5000	77.38
6300	78.19

8000 75.34

100000	73.87
--------	-------

755VO 10.08







un	406	1
test_prog	Alison96	3
test_num	LARC APL	
test_facil	Alison	
test_cust	Kathy Boyd	
test_ano	Alison	
test_1	Alison	
test_2	Alison	
test_3	Alison	
test_4	Alison	
test_5	Alison	
test_6	Alison	
test_7	Alison	
test_8	Alison	
test_9	Alison	
test_10	Alison	
test_11	Alison	
test_12	Alison	
test_13	Alison	
test_14	Alison	
test_15	Alison	
test_16	Alison	
test_17	Alison	
test_18	Alison	
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test_80	Alison	
test_81	Alison	
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test_84	Alison	
test_85	Alison	
test_86	Alison	
test_87	Alison	
test_88	Alison	
test_89	Alison	
test_90	Alison	
test_91	Alison	
test_92	Alison	
test_93	Alison	
test_94	Alison	
test_95	Alison	
test_96	Alison	
test_97	Alison	
test_98	Alison	
test_99	Alison	
test_100	Alison	

0/200 DE 1.5 input = 1.50

Value number 14.30 psd	Date number 538 0 B
------------------------	---------------------

Capital structure	530.00%
Debt to equity	70.00%

<b>Data source</b>	1
<b>Data scales</b>	

**Abstract**

distance: 150

yaw angle 55

roll angle (

frequency 55 0

0 0  
0 0  
0 0  
0 0

100	88.9
130	88.94

130	69.64
160	72.52

160	72.34
200	72.87

250 75.07

77.47

400	70.67
-----	-------

500	80.37
-----	-------

80.52

800 82.35

1000	69.53
1200	84.41

1300	84.41
1500	84.33

1600	84.32
2000	84.84

2000 \$4.15  
2500 \$4.45

3200 113.67

4000 82.43

5000 81.05

6300	79.55
6300	79.55

3000	78.24
10000	75.07

KASVO  
000001

UNIVERSITY OF CALIFORNIA



prog	406
run	1
test_prog	Alison96
test_num	3
test_jack	LeRC APL
test_cue	Alison
lead_hero	Kathy Boyd
lead_vox	Kathy Boyd
lead_engr	Rory Cassner
natrod	NATR full wedge
natrod	JER w/ external statement

21:57:38  
 Scenario: Fly-over, full scale, 1500' side-line, standard day  
 Wed Aug 20 04:49:11 1997  
 Processing date:

Data amb: 14.70 pols	
Data amb: 537.0 A	
Data amb: 70.00%	
Data amb: 1	

Distance (m)	1831.16	1732.05	1685.07	1586.27	1552.31	1523.14	1505.73	1500	1505.73	1523.14	1552.31	1586.27	1685.07	1732.05	1831.16	1956.11	2121.32	2333.58	2615.17	3000	3549.71	4305.71	5795.55
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165
100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265
200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315
250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365
300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415
350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465
400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515
450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565
500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615
550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665
600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715
650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765
700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815
750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865
800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915
850	855	860	865																				







[Flyover data point L for 50 %L, 12TH (file T407.xls) not processed]



## **50%L, 16UH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L







526

Data amb= 14.70 psia  
Data amb= 537.0 F  
Data amb= 70.00%  
Data scale 1

baseline: [	1831.16	1732.05	1655.07	1596.37	1552.91	1523.14	1506.73	1500	1506.73	1523.14	1552.91	1596.37	1655.07	1732.05	1831.16	2023.58	2013.17	3000	3549.33	4386.71	5795.55
raw angle [°]	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	165
frequency	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	
50	59.36	41.18	42.58	43.58	44.33	44.86	45.25	45.56	45.84	46.14	46.41	46.67	46.93	47.17	47.37	47.56	47.73	47.88	48.01	48.12	
60	59.36	43.23	43.58	43.56	43.56	44.12	44.23	44.3	44.3	44.64	44.81	44.97	45.13	45.27	45.39	45.48	45.55	45.61	45.66	45.70	
70	41.38	41.78	42.03	43.81	44.13	44.18	44.45	44.86	44.85	47.23	47.78	48.28	48.72	49.05	49.25	49.38	49.44	49.48	49.51	49.53	
80	40.86	41.75	43.09	44.17	45.1	45.93	47.86	48.48	48.45	48.42	48.52	48.53	48.53	48.53	48.53	48.53	48.53	48.53	48.53	48.53	
90	180	41.75	43.09	44.17	45.1	45.93	47.86	48.48	48.45	48.42	48.52	48.53	48.53	48.53	48.53	48.53	48.53	48.53	48.53	48.53	
100	200	42.82	44.19	45.18	46.02	46.81	47.8	48.53	49.23	49.56	49.82	50.15	50.67	51.15	51.42	51.61	51.74	51.83	51.9	51.96	
110	250	44.44	46.07	47.37	48.42	49.27	49.87	50.56	51.18	52.1	52.64	53.21	53.71	54.15	54.52	54.83	55.09	55.28	55.45	55.6	
120	300	44.47	45.82	47.3	48.36	49.28	50.04	50.98	51.18	52.15	52.68	53.39	53.71	54.15	54.52	54.83	55.09	55.28	55.45	55.6	
130	400	42.49	44.7	45.82	48.01	49.23	50.67	51.07	51.52	52.03	52.68	53.39	53.71	54.15	54.52	54.83	55.09	55.28	55.45	55.6	
140	500	42.55	45.08	47.58	49.14	50.67	51.07	51.52	52.03	52.68	53.39	53.71	54.15	54.52	54.83	55.09	55.28	55.45	55.6	55.6	
150	600	42.55	45.08	47.58	49.14	50.67	51.07	51.52	52.03	52.68	53.39	53.71	54.15	54.52	54.83	55.09	55.28	55.45	55.6	55.6	
160	800	42.55	45.08	47.58	49.14	50.67	51.07	51.52	52.03	52.68	53.39	53.71	54.15	54.52	54.83	55.09	55.28	55.45	55.6	55.6	
170	1000	39.22	42.45	44.78	46.81	48.18	48.83	49.36	49.98	50.67	51.28	51.83	52.41	52.94	53.44	53.85	54.26	54.67	55.06	55.45	
180	1300	36.23	41.43	44.81	45.7	46.41	47.87	48.55	49.48	50.66	51.19	51.73	52.31	52.81	53.13	53.57	53.96	54.32	54.67	55.06	
1900	1600	36.4	39.86	42.13	43.77	44.54	45.21	45.95	46.57	48.19	47.1	47.87	48.2	48.37	48.52	48.64	48.71	48.78	48.83	48.87	
2000	2000	34.82	36.36	40.14	41.8	42.86	43.96	44.99	45.96	46.86	47.17	47.87	48.2	48.37	48.52	48.64	48.71	48.78	48.83	48.87	
2500	3200	33.69	36.48	38.61	39.64	41.36	42.15	42.82	43.77	44.54	45.21</										



[illegible]

Data ambid 14.30 para  
Data ambid 5.36.0 R  
Data ambid 70.00%

1

Yaw angle	55	50
Displacement (l)	0.00	0.00

roll angle (°)	frequency
0	55
5	55

80 71.73

130 74.36

100	75.74
200	75.74

250	76.13
320	76.67

400	75.68
500	76.42

630 78.14

75.92  
1000

1300	75.71
1600	75.46

2000	74.84
2000	73.97

3200 72.88

5000 70.53

6300 67.74

10000	85.48
14500	87.86

[illegible]



[illegible]



[illegible]











rod	123
run	1
test_prog	Alison86
test_num	3
test_incl	LeRC AP1
test_cust	Alison
head_warr	Kathy Boyd
head_scor	Kathy Boyd
head_engnr	Ray Casiner
matribd	NATR full wedge
nmbid	JER w/ external supplement

bchtime 20:14:17  
 ---Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Tue Aug 19 18:55:00 1997

Data ambir	14.70 pais
Data ambir	537.0 R
Data ambir	70.00%
Data scale	1

[illegible]







534

Data ambis	14.70 pada
Data ambis	537.0 FI
Data ambis	70.00%
Data ambis	1



[illegible]











538

Order number 14 70 0019

Data umbk 537.0 A

70.00%	Data attribute
--------	----------------

Data scale

Ex. 100-1 1971 18

VIEW BOOK 55

roll angle (°)

frequency  
55

703 08  
09.07 08

100	50.4
150	52.31

100	52.8
100	52.8

200 53.6

250 54.85

320	54.4
400	53.83

400	53.00
500	53.15

830 53.71

800 53.88

1000	53.82
1300	53.37

1300	\$2.97
1600	\$2.97

2000	51.05
------	-------

2500	48.44
------	-------

3200	44.32
1000	14.71

4000 5000

16.76

00000

0 10000 20000 30000 40000 50000 60000 70000 80000 90000 100000

CASH	74.20
PAID	74.20

3







540

data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80																				



541

Data अभी 14.30 पेस  
Data अभी 536.0 R  
Data अभी 70.00%

Data scale	Distance: (°)	150	55
raw scale			

rod angle (°)	frequency
0	80
55	100
0	
0	

0	0	0
130	160	200

250	50.51
320	63.52
400	58.17
500	62.33

630	59.07
800	60.88
1000	60.14
1300	58.4

1800	55.4
2000	50.4
2500	54.28
3200	55.42

4000	55.6
5000	57.67
6000	70.23
7000	84.8

10000  
OASPL



542

[illegible]







[illegible]











547

ata amb	14.30 psi
ata amb	538.0 ft
ata amb	70.00%
ata amb	1

ata amb	14.30 psi
ata amb	538.0 ft
ata amb	70.00%
ata amb	1







## **50%L, 20UH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L















cdg	319
un	1
test_prog	Alison98
test_num	3
test_fac1	LEPC API
test_cust	Alison
test_zero	Kathy Boyd
test_acous	Kathy Boyd
test_engr	Ray Cashner
test_nul	NATR nul wedges
test_jfer	JFER w/ external supplement

bchtime 21:03:48  
 --Scenario: Fly-over, Aut-scale, 1500 sidings, standard day  
 Processing date: Wed Aug 20 02:28:13 1997

Data ambig 14.70 polia  
Data ambig 537.0 R  
Data ambig 70.00%  
Data scale 1

[illegible]



Data ambir	14.30 psi
Data ambir	538.0 R
Data ambir	70.00%
Data ambir	1

[illegible]











557



rdg	325
run	1
test_prog	Altisorb
test_num	3
test_fcd	LeRC APL
test_cust	Altison
lead_sero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engr	Play Casiner
matrid	NATR full wedge
method	JER w/external supplement

bchtime 22:01:10  
 \*\*Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Processing date: Wed Aug 20 02:37:30 1997

Data attribute	14.300 pale
Data attribute	538.0 FI
Data attribute	70.00%
Data attribute	!

distance: 150 ft

roll angle (°)	yaw angle (°)
0	0

0  
60  
100

130	62.96
160	59.71

200	58.91
250	60.11

320	61.73
400	61.48

85.45

1000	54.99
1300	54.99

1600	67.62
2000	75.33

2500	61.26
3200	63.09

4000	64.38
5000	58.48

58.85

045PL	70.00
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NASA Lewis Allison A57 Jet Noise Test 1986[illegible]



og	324
un	1
test_prog	Allison8
test_num	3
test_faci	LoRC APL
test_cust	Akron
read_aero	Kathy Boyd
read_acou	Kathy Boyd
read_engir	Ray Castner
readbed	NATR full wedge
read	JER w/ external supplement

21:49:23  
 Scenario: 150 foot arc; 77F, 70%; Full scale; Third-octave SPL  
 Processing date: Fri Aug 22 15:00:10 1997

Processing date:

Data ambient 14.30 pairs  
Data ambient 536.0 A  
Data ambient 70.00%  
Data scale 1

Date rec'd:

...

150

55

0 ) before 1914

frequency

1253

100 67.29

100	91.45
130	75.70

130 7118

300	70.10
300	70.1

200	70.1
250	71.58

77.87  
72.67

12.0	72.48
100	72.48

74.40	500
72.81	505

300 71.25

500	75.28
500	75.14

1000	75.14
1000	75.75

1,300 75.48

1500	70.43
1500	70.77

2000	75.99
2001	75.99

2000	74.68
1999	74.68

72 48

70 07

0005  
0006

**0690**

5000  
5000

00000 00000

10570 25 M 2

333







[illegible]



[illegible]



[illegible]



[illegible]

500' sideline, standard day  
Mon Aug 18 11:22:49 1997

Data sample 14.70 pairs
Data sample 537.0 R
Data sample 70.00%
Data sample 1

[illegible]



[illegible]

Scadenza: 150 re  
Processing date:

8/20/00 11:30 AM

Date emb'd: 538.0 A

Days until	70.00%
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Data scale

distance: (1) 150

yaw angle 55

roll angle (°)	frequency
0	55

08 00

100

130 00

2002

250 50.84

0	320
55 02	100

400	53.86
500	63.22

630 62

800	66.13
1,000	64.88

1000	64.82
1300	64.67

1600 60.12

2000	74.12
2500	86.47

2300	83.75
3200	83.75

4000	62.55
------	-------

5000	59.05
1700	59.94

5000 60.52

10000	81.49
-------	-------

7d5v0 77.98







568

[illegible]



569

[illegible]



[illegible]

Data arrived 14.30 p.m.

Date: 14.05.2014

Data	70.00%
------	--------

Data scale 1

3

distance: (1' 150 ft)

Yaw angle	Roll angle /
55°	0°

58 ) expose you

Frequency	0
30	0

100 000

130 69.57

160	71.95
-----	-------

200 72.00

250 74 18

320	74.70
120	74.70

400	75.65
500	79.31

500	76.31
630	77.6

830	77.5
900	79.28

500	79.28
1000	81.09

1000	01.50
1300	02.02

1500	83.12
1600	83.12

2000	83.44
------	-------

2300 81.90

3200 60.02

4000	77.39
1000	75.4

5000	75.4
8300	74.2

6300	742
8000	7353

60000	73.63
100000	72.11

CASPI 91.7

555



[illegible][illegible]







[illegible]



## **50% L, 20MH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, H, I, J, K, L



run	356	1
prog	AlisonR	
test_num	3	
test_fac1	LARC AP1	
test_fac2	LARC	
test_fac3	AP1	
test_fac4	AP1	
test_fac5	AP1	
test_fac6	AP1	
test_fac7	AP1	
test_fac8	AP1	
test_fac9	AP1	
test_fac10	AP1	
test_fac11	AP1	
test_fac12	AP1	
test_fac13	AP1	
test_fac14	AP1	
test_fac15	AP1	
test_fac16	AP1	
test_fac17	AP1	
test_fac18	AP1	
test_fac19	AP1	
test_fac20	AP1	
test_fac21	AP1	
test_fac22	AP1	
test_fac23	AP1	
test_fac24	AP1	
test_fac25	AP1	
test_fac26	AP1	
test_fac27	AP1	
test_fac28	AP1	
test_fac29	AP1	
test_fac30	AP1	
test_fac31	AP1	
test_fac32	AP1	
test_fac33	AP1	
test_fac34	AP1	
test_fac35	AP1	
test_fac36	AP1	
test_fac37	AP1	
test_fac38	AP1	
test_fac39	AP1	
test_fac40	AP1	
test_fac41	AP1	
test_fac42	AP1	
test_fac43	AP1	
test_fac44	AP1	
test_fac45	AP1	
test_fac46	AP1	
test_fac47	AP1	
test_fac48	AP1	
test_fac49	AP1	
test_fac50	AP1	
test_fac51	AP1	
test_fac52	AP1	
test_fac53	AP1	
test_fac54	AP1	
test_fac55	AP1	
test_fac56	AP1	
test_fac57	AP1	
test_fac58	AP1	
test_fac59	AP1	
test_fac60	AP1	
test_fac61	AP1	
test_fac62	AP1	
test_fac63	AP1	
test_fac64	AP1	
test_fac65	AP1	
test_fac66	AP1	
test_fac67	AP1	
test_fac68	AP1	
test_fac69	AP1	
test_fac70	AP1	
test_fac71	AP1	
test_fac72	AP1	
test_fac73	AP1	
test_fac74	AP1	
test_fac75	AP1	
test_fac76	AP1	
test_fac77	AP1	
test_fac78	AP1	
test_fac79	AP1	
test_fac80	AP1	
test_fac81	AP1	
test_fac82	AP1	
test_fac83	AP1	
test_fac84	AP1	
test_fac85	AP1	
test_fac86	AP1	
test_fac87	AP1	
test_fac88	AP1	
test_fac89	AP1	
test_fac90	AP1	
test_fac91	AP1	
test_fac92	AP1	
test_fac93	AP1	
test_fac94	AP1	
test_fac95	AP1	
test_fac96	AP1	
test_fac97	AP1	
test_fac98	AP1	
test_fac99	AP1	
test_fac100	AP1	
test_fac101	AP1	
test_fac102	AP1	
test_fac103	AP1	
test_fac104	AP1	
test_fac105	AP1	
test_fac106	AP1	
test_fac107	AP1	
test_fac108	AP1	
test_fac109	AP1	
test_fac110	AP1	
test_fac111	AP1	
test_fac112	AP1	
test_fac113	AP1	
test_fac114	AP1	
test_fac115	AP1	
test_fac116	AP1	
test_fac117	AP1	
test_fac118	AP1	
test_fac119	AP1	
test_fac120	AP1	
test_fac121	AP1	
test_fac122	AP1	
test_fac123	AP1	
test_fac124	AP1	
test_fac125	AP1	
test_fac126	AP1	
test_fac127	AP1	
test_fac128	AP1	
test_fac129	AP1	
test_fac130	AP1	
test_fac131	AP1	
test_fac132	AP1	
test_fac133	AP1	
test_fac134	AP1	
test_fac135	AP1	
test_fac136	AP1	
test_fac137	AP1	
test_fac138	AP1	
test_fac139	AP1	
test_fac140	AP1	
test_fac141	AP1	
test_fac142	AP1	
test_fac143	AP1	
test_fac144	AP1	
test_fac145	AP1	
test_fac146	AP1	
test_fac147	AP1	
test_fac148	AP1	
test_fac149	AP1	
test_fac150	AP1	
test_fac151	AP1	
test_fac152	AP1	
test_fac153</		

Data ambiti	14.30 psia
Data ambiti	538.0 R
Data ambiti	70.00%
Data scale	1

distance (°)	150
yaw angle	55
roll angle (°)	0

Frequency	5.5
80	82.02
100	82.78
130	85.31
160	85.81

200	65.9
250	67.03
320	67.06
400	65.47

500	66.22
630	65.86
800	65.55
1000	64.73
1300	64.15

1000	63.13
1800	62.55
2000	61.59
2500	60.75

4000	59.7
5000	56.69
6300	57.81
8000	57.2
10000	55.29

QASPL	77.4
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[illegible]



576

Data ambis	14.70 posla
Data ambis	537.0 R
Data ambis	70.00%
Data scale	1

[illegible]



g	357
n	1
prog	Mklonge
si	3
at	hum
ad	LPC
faci	APL
l	10
ad	W
jeo	Kelly Boyd
ad	accu Kelly Boyd
ad	eng-Ray Cushman
ad	NATR Luf wedge
JER w	external supplement
MD20	
obdd	
S450	
proz	41.226
misc	95.02
misc	78.39
misc	810.77
001	0.00398
14	14.3487
emb	498.284
74.21	
umid	
model1	0
prec	1.361
dpd	1.442
ic	18.959
db	20.8908
acsz	2.784
msc	1.515
112.0	
6	405.891
20	20.5853
mixr	610.103
mpnd	0.676934
svrsvap	13309
sudcham	[26]
wegnd	350
ncade	02 Dec.96
scme	21.35.46
HACData	02 Dec.96
HAUSHOW	02 Dec.96
actime	21.35.48
[Scanner: 150 foot arc, 77% Full scale, Third octave SPL Word Aug 20 03:28:25 1987]	

Data ambik	14.30 pada
Data ambik	536.0 A
Data ambik	70.00%
Data ambik	1

Distance, ft	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	165 PWL
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10	73.07	73.8	74.48	75.15	75.6	76.45	77.11	77.69	78.19	78.68	79.24	80.04	81.09	82.28	83.2	84.76	86.41	88.34	90.18	91.95	92.45	92.22	92.17	
20	74.79	75.28	75.97	76.67	77.38	78.06	78.76	79.46	80.16	80.86	81.56	82.26	82.96	83.66	84.36	85.06	85.76	86.46	87.16	87.86	88.56	89.26	89.01	
30	76.49	77.01	77.52	78.03	78.54	79.05	79.56	80.07	80.58	81.09	81.6	82.11	82.62	83.13	83.64	84.15	84.66	85.17	85.68	86.19	86.7	87.21	86.96	
40	78.18	78.71	79.22	79.73	80.24	80.75	81.26	81.77	82.28	82.79	83.3	83.81	84.32	84.83	85.34	85.85	86.36	86.87	87.38	87.89	88.4	88.91	88.66	
50	79.88	80.41	80.92	81.43	81.94	82.45	82.96	83.47	83.98	84.49	85.0	85.51	86.02	86.53	87.04	87.55	88.06	88.57	89.08	89.59	90.1	90.61	90.36	
60	81.58	82.11	82.62	83.13	83.64	84.15	84.66	85.17	85.68	86.19	86.7	87.21	87.72	88.23	88.74	89.25	89.76	90.27	90.78	91.29	91.8	92.31	92.06	
70	83.28	83.81	84.32	84.83	85.34	85.85	86.36	86.87	87.38	87.89	88.4	88.91	89.42	89.93	90.44	90.95	91.46	91.97	92.48	92.99	93.5	94.01	93.76	
80	84.98	85.51	86.02	86.53	87.04	87.55	88.06	88.57	89.08	89.59	90.1	90.61	91.12	91.63	92.14	92.65	93.16	93.67	94.18	94.69	95.2	95.71	95.46	
90	86.68	87.21	87.72	88.23	88.74	89.25	89.76	90.27	90.78	91.29	91.8	92.31	92.82	93.33	93.84	94.35	94.86	95.37	95.88	96.39	96.9	97.41	97.16	
100	88.38	88.91	89.42	89.93	90.44	90.95	91.46	91.97	92.48	92.99	93.5	94.01	94.52	95.03	95.54	96.05	96.56	97.07	97.58	98.09	98.6	99.11	98.86	
110	90.08	90.61	91.12	91.63	92.14	92.65	93.16	93.67	94.18	94.69	95.2	95.71	96.22	96.73	97.24	97.75	98.26	98.77	99.28	99.79	100.3	100.81	100.56	
120	91.78	92.31	92.82	93.33	93.84	94.35	94.86	95.37	95.88	96.39	96.9	97.41	97.92	98.43	98.94	99.45	99.96	100.47	100.98	101.49	102.0	102.51	102.26	
130	93.48	94.01	94.52	95.03	95.54	96.05	96.56	97.07	97.58	98.09	98.6	99.11	99.62	100.13	100.64	101.15	101.66	102.17	102.68	103.19	103.7	104.21	103.96	
140	95.18	95.71	96.22	96.73	97.24	97.75	98.26	98.77	99.28	99.79	100.3	100.81	101.32	101.83	102.34	102.85	103.36	103.87	104.38	104.89	105.4	105.91	105.66	
150	96.88	97.41	97.92	98.43	98.94	99.45	99.96	100.47	100.98	101.49	102.0	102.51	103.02	103.53	104.04	104.55	105.06	105.57	106.08	106.59	107.1	107.61	107.36	
160	98.58	99.11	99.62	100.13	100.64</																			







[illegible][illegible]



580

Data ambis	14,70 pola
Data ambis	537,0 R
Data ambis	70,00%
Data scale	1



**NASA Lewis Allison AST Jet Noise Test 1998**

dog	359	
run	1	
test_prog	AlisonB	
test_num	3	
test_jack	LeRC APL	
test_cust	Alison	
test_aero	Kathy Boyd	
test_accu	Kathy Boyd	
test_engr	Ray Casiner	
testnoid	NATR full wedge	
trigrid	JER w/ external supplement	

Date and time 14.30 pm

Carta aerea 14,50 pz  
 Data aerea 538,0 A

Delta 3mbin	70.00%
-------------	--------

Date scale 1

100

distance: (1) 150 68

Yaw angle	Roll angle /
55	0

roll angle (°)	frequency
0	55
55	0

frequency	55
80	80.57

80	80.57
100	84.06

130 85.21

150 88.42

200 90 22

250	85.34
-----	-------

320	85.73
100	84.82

400	84.82
500	85.22

630	65.27
800	85.7

600	83.7
1000	85.04

1300	65.6
1300	65.6

1000	65.99
1000	65.99

2000	85.98
2001	86.78

2500	85.75
3000	86.02

3200	85.92
4000	86.22

4000	80.22
5000	85.89

5000	85.8
6300	85.8

6500	65.0
8000	85.59

5000	82.58
10000	82.64

04591 CASPI 00.03

1125







Data ambt	14.30 psia
Data ambt	538.0 ft
Data ambt	70.00%
Data scale	1

[illegible]







## NASA/CR—2002-210823/VOL2

585

1



[illegible][illegible]







[illegible]







[illegible][illegible]



[illegible]

Data ambi 14.30 p.m.  
Data ambi 536.0 R  
Data ambi 70.00%  
Data scale 1

distance (°)

yaw angle	roll angle ( $^{\circ}$ )	frequency
0	0	55

00  
88

130	61.96
160	66.72
200	68.02

250	69.32
320	71.18

400	70.2
500	71.52
820	71.47

600	72.45
800	73.73
1000	

1300	73.85
1600	74.14
2000	73.55

2000	73.33
2500	72.42
3200	71.29

4000	70.33
5000	69.39
6000	79.74

6300	76.76
8000	69.59
10000	72.13

OASPL 85.28







593

Date	sample 14.30 pasta
Date	sample 536.0 R
Date	sample 70.00%
Date	scale 1

Date	sample 14.30 pasta
Date	sample 536.0 R
Date	sample 70.00%
Date	scale 1











[illegible]



## **50% L, 20DH**

150 ft Polar: SPL( $\theta$ , f), OASPL( $\theta$ ), PWL(f), OAPWL  
1500 ft Flyover: SPL( $\theta$ , f), OASPL( $\theta$ ), PNL( $\theta$ ), EPNL, PWL(f), OAPWL  
Operating Conditions: A, B, C, D, E, F, G, H, I, J, K, L







[illegible]



## NASA/CR—2002-210823/VOL2

600

}



run 251  
test\_prog Allison6  
test\_num 3  
test\_name LARC APL  
test\_cell Allison  
test\_engine Allison  
test\_sonr Kathy Boyd  
test\_engr Ray Casner  
nauid NATR full wedge  
rptid JER w/ internal supplement  
mtrcid DP20  
nozbld SH50  
anoz 41.228  
amsc 35.02  
amrdb 78.38  
amrdb 4  
amrdb 812.58  
mtr 0.01814  
pamb 14.4837  
lamb 485.611  
rhamb 84.22  
windbl 0  
rporc 1.393  
rporb 1.438  
pfc 20.1478  
pfc 20.1478  
pfc 20.1478  
wtrc 2.849  
wtrc 13.765  
trc 1159.21  
trb 485.237  
trb 20.6938  
trms 603.232  
mtrpid 0.674607  
grnvsp 13337.7  
bactum [26] 245  
bactum 22 Nov 98  
bactum 19.34.38  
DAOScale 22 Nov 98  
DAOScale 19.34.38  
bchdble 22 Nov 98  
bchdble 19.34.38  
bchdble 19.34.38

Processing file: 1500.mph, full scale, 1500 mph, standard day  
Wed Aug 20 01:15:53 1997

Data: 14.70, 70, 100  
Data: 14.70, 70, 100  
Data: 14.70, 70, 100  
Data: 14.70, 70, 100

Distance (	1831.18	1732.05	1655.07	1599.27	1552.91	1523.14	1506.73	1500	1505.73	1523.14	1552.91	1599.27	1655.07	1732.05	1831.18	1953.11	2121.32	2333.58	2615.17	3000	3549.3	4385.71	5795.56
new angle (	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
frequency	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
100	49.9	51.46	52.75	54.81	56.84	58.84	60.84	62.84	64.84	66.84	68.84	70.84	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	
150	50.9	52.46	53.75	55.81	57.84	59.84	61.84	63.84	65.84	67.84	69.84	71.84	73.84	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	
200	51.9	53.46	54.75	56.81	58.84	60.84	62.84	64.84	66.84	68.84	70.84	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	
250	52.9	54.46	55.75	57.81	59.84	61.84	63.84	65.84	67.84	69.84	71.84	73.84	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	
300	53.9	55.46	56.75	58.81	60.84	62.84	64.84	66.84	68.84	70.84	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	94.84	
400	54.9	56.46	57.75	59.81	61.84	63.84	65.84	67.84	69.84	71.84	73.84	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	95.84	
500	55.9	57.46	58.75	60.81	62.84	64.84	66.84	68.84	70.84	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	94.84	96.84	
600	56.9	58.46	59.75	61.81	63.84	65.84	67.84	69.84	71.84	73.84	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	95.84	97.84	
800	57.9	59.46	60.75	62.81	64.84	66.84	68.84	70.84	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	94.84	96.84	98.84	
1000	58.9	60.46	61.75	63.81	65.84	67.84	69.84	71.84	73.84	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	95.84	97.84	99.84	
1200	59.9	61.46	62.75	64.81	66.84	68.84	70.84	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	94.84	96.84	98.84	100.84	
1500	60.9	62.46	63.75	65.81	67.84	69.84	71.84	73.84	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	95.84	97.84	99.84	101.84	
2000	61.9	63.46	64.75	66.81	68.84	70.84	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	94.84	96.84	98.84	100.84	102.84	
2500	62.9	64.46	65.75	67.81	69.84	71.84	73.84	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	95.84	97.84	99.84	101.84	103.84	
3000	63.9	65.46	66.75	68.81	70.84	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	94.84	96.84	98.84	100.84	102.84	104.84	
4000	64.9	66.46	67.75	69.81	71.84	73.84	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	95.84	97.84	99.84	101.84	103.84	105.84	
5000	65.9	67.46	68.75	70.81	72.84	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	94.84	96.84	98.84	100.84	102.84	104.84	106.84	
6000	66.9	68.46	69.75	71.81	73.84	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	95.84	97.84	99.84	101.84	103.84	105.84	107.84	
8000	67.9	69.46	70.75	72.81	74.84	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	94.84	96.84	98.84	100.84	102.84	104.84	106.84	108.84	
10000	68.9	70.46	71.75	73.81	75.84	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	95.84	97.84	99.84	101.84	103.84	105.84	107.84	109.84	
DAOSPL	69.9	71.46	72.75	74.81	76.84	78.84	80.84	82.84	84.84	86.84	88.84	90.84	92.84	94.84	96.84	98.84	100.84	102.84	104.84	106.84	108.84	110.84	
PWL	70.9	72.46	73.75	75.81	77.84	79.84	81.84	83.84	85.84	87.84	89.84	91.84	93.84	95.84	97.84	99.84	101.84	103.84	105.84	107.84	109.84	111.84	







603

Data ambig	14.70 pela
Data ambig	537.0 R
Data ambig	70.00%
Data scale	1



## NASA Lewis Allison AST Jet Noise Test 1998

[illegible][illegible]



[illegible]







607

Date range: 14-70 yds	Date range: 53.0 R	Date range: 70.00%	Date scale	1	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55	
Distance (ft)	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55					
Yard angle	55	0	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	
Yard angle	55	0	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	
Frequency	35	35	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60		
1	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55					
2	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55					
3	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55					
4	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55					
5	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55					
6	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55					
7	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55					
8	1831.16	1732.05	1855.07	1908.27	1952.91	1923.14	1905.73	1900	1905.73	1920.14	1952.91	1908.27	1855.07	1732.05	1831.16	1868.11	2121.32	2232.58	2815.17	3000	3549.3	4385.51	5795.55					
9	1831.16	17																										



[illegible]



rgg	257
run	1
test_prog	Allison88
test_num	3
test_facil	LeRC APL
test_cust	Allison
test_sero	Kathy Boyd
test_acou	Kathy Boyd
test_engr	Ray Casner
natid	NATR full wedge
nerd	JER w/ external supplement

bchtime 20:37:59  
 \*\*Scenario: Fly-over, full-scale, 1500' sideline, standard day  
 Processing date: Fri Aug 22 14:32:03 1997

Data ambie	14.70 pairs
Data ambie	537.0 R
Data ambie	70.00%
Data scale	1

[illegible]



[illegible]



[illegible]

Data anni 14.70 mila  
 Data anni 537.0 FI  
 Data anni 70.00%  
 Data anni 1

[illegible]











[illegible]



[illegible]



616

[illegible]



rdg	260
run	1
test_prog	Allison66
test_num	3
test_facil	LoRC APL
test_cmt	Allison
lead_sero	Kathy Boyd
lead_acou	Kathy Boyd
lead_engr	Ray Cashner
rebird	NATR full wedge
ngbird	JER w/ external supplement

batchtime 20:55:12  
 \*\*Scenario Fly-over, full-scale, 1500 sideline, standard day  
 Processing date: Wed Aug 27 10:12:39 1997

**Processing date:**

1

Data symbol 14.70 pata  
Data symbol 537.0 B

Days until 307.0 V	
Days until 70.00%	

Data source 1

Distance: 11.831 18

yaw angle 55

55  
0

frequency	64	30 07
-----------	----	-------

80 40.77

100	45.29
130	42.29

160 43.08

200	47.38
250	40.34

48.18 48.38

400 43.04

500	45.83
620	48.28

600	40.43
800	40.41

1000	45.7
------	------

1300	42.87
1600	43.48

41.7

2500	38.34
3000	43.18

3200 23.56

0  
5000

0000

100000  
0

57.1

PM 00.5







619



[illegible]



621

Data ambli	14.70 pass
Data ambli	537.0 A
Data ambli	70.00%
Data ambli	!



REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
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6. AUTHOR(S)  Vinod G. Mengle, V. David Baker, and William N. Dalton				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  Rolls Royce Allison P.O. Box 420 Indianapolis, Indiana 46206-0420			8. PERFORMING ORGANIZATION REPORT NUMBER  E-12741-2	
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13. ABSTRACT (Maximum 200 words)  A comprehensive database for the acoustic and aerodynamic characteristics of several model-scale lobe mixers of bypass ratio 5 to 6 has been created for mixed jet speeds up to 1080 ft/s at typical take-off (TO) conditions of small-to-medium turbofan engines. The flight effect was simulated for Mach numbers up to 0.3. The static thrust performance and plume data were also obtained at typical TO and cruise conditions. The tests were done at NASA Lewis anechoic dome and ASE's FluiDyne Laboratories. The effect of several lobe mixer and nozzle parameters, such as, lobe scalloping, lobe count, lobe penetration and nozzle length was examined in terms of flyover noise at constant altitude and also noise in the reference frame of the nozzle. This volume is divided into three parts: in the first two parts, we collate the plume survey data in graphical form (line, contour and surface plots) and analyze it; in part 3, we tabulate the aerodynamic data for the acoustics tests and the acoustic data in one-third octave band levels.				
14. SUBJECT TERMS Engine noise; Jet noise; Lobed mixers; Aeroacoustics; Internal noise; Excess noise; Nozzle length; Mixing length; Lobe scalloping; Thrust coefficient; Turbofan mixing; Jet plumes; Flight effect; Lobe count; Lobe penetration; Lobe scalloping			15. NUMBER OF PAGES 626	
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